The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 89, No. 15 CHICAGO, ILLINOIS OCTOBER 8, 1927

INDICATIONS FOR SURGICAL INTERVENTION IN PELVIC LESIONS OF INFECTIOUS ORIGIN

BASED ON SEVENTEEN YEARS OF LABORATORY AND CLINICAL STUDY *

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A correlated laboratory and clinical study of pelvic infections has now been continuously pursued for many years. With this work as a basis, I present certain problems of surgical interest in the management of patients with inflammatory lesions of the pelvic viscera.

SPECIAL FEATURES OF VAGINAL DISCHARGES

A study of the bacteriology of chronic leukorrhea, first reported in 1914, revealed that the chief sources of infectious vaginal discharges are Skene's ducts and the uterine cervix. Other external genitalia rarely play a notable part in the etiology. The discovery of the chief foci responsible for leukorrhea turned physicians away from intra-uterine therapy and helped to establish the modern belief that endocervicitis is the essential lesion in these cases. We still fail to relieve a relatively large proportion of patients with chronic leukorrhea. In our enthusiasm over treatment of the cervix there is a tendency to neglect a second important source of trouble: the part played by Skene's duct infections must not be underestimated or overlooked. Many a patient with discharge coming solely from lesions of these minute glands is erroneously subjected to repeated cautery treatment of a healthy cervix.

The bacteriologic flora of purulent vaginal discharges consists mainly of anaerobic bacteria of low virulence, staphylococci, and gram-positive diplococci. Extreme importance attaches to the diplococci; they are present in fully 30 per cent of patients with purulent leukorrhea and develop, in cultures, into pathogenic streptococci of distinct virulence. In other words, one out of every three women with creamy vaginal discharge must be assumed to be a carrier of bacteria that jeopardize her life if pregnancy occurs. Lacerations of the cervix at the time of labor, if extended upward into the venous sinuses or cellular tissues of these patients, are followed by a considerable percentage of serious infections, with an unusually high incidence of morbidity and mortality.

ENDOCERVICITIS

Emphasis on the frequency of infections of the cervix is no longer necessary. But why does endocervicitis fail to heal spontaneously and how may the encouraging results obtained by present-day methods of treatment best be explained? The answer, I believe, lies in the word "drainage."

Granulations and strictures of the cervical canal are exceedingly frequent and are a very important factor in interference with drainage. Failure of drainage results not only from these gross lesions but also from microscopic ones. This is evident histologic study, which reveals a frequent incidence of infected glandular pockets more or less deeply buried in the walls of the endocervix.

The viscid cervical secretion also plays a part in maintaining infection. Mucus drains poorly and prevents recovery. A similar retarding influence is observed, experimentally, in patients subjected to frequent endocervical applications of petrolatum.

Electric cautery treatment of endocervicitis probably owes its efficiency to the establishment of thorough drainage even more than to eradication of the diseased tissues. This is evidenced by the fact that cauterization for relief of long persistent discharge often fails to yield prompt results but eventuates in complete recovery many months subsequently, or even as much as a year later.

It is my practice to employ the cautery at infrequent intervals, first because one or two treatments may suffice, and, secondly, because repeated instrumentation predisposes to infection as well as to the development of cervical strictures.

Emphasis on the cautery at this time does not imply that other methods of treatment are of lesser value. Certain plastic operations on the cervix, notably the Sturmdorf operation, merit hearty approval.

ENDOMETRITIS

With apologies for reiteration of previously recorded work, I am impelled to recall my experience in studying the endometrium. A bacteriologic investigation of thoroughly ground endometrium, obtained from uteri removed to remedy various pathologic conditions, revealed that the body of the uterus seldom harbors chronic infection. This evidence confirms, bacteriologically, previous histologic studies of Hitschmann and Adler. As a result of this cumulative experience, the former classification of endometritis has finally been swept away; "chronic endometritis" is no longer worthy of emphasis as a clinical entity. It is of interest chiefly as a mile-post which marks the progress of our specialty.

As a corollary to my bacteriologic and histologic study of the endometrium, I have found frequent evidence of acute endometritis in the uteri of women subjected to hysterectomy several days subsequent to preliminary diagnostic curettage. It appears difficult to invade the uterine cavity without introducing some bacteria.

Since laboratory recognition of this "instrumentation acute endometritis" I have observed, clinically, a con-

* Chairman's address, read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 19, 1927.

siderable incidence of postoperative peritoneal infections after supravaginal hysterectomy performed on patients curetted a few days previously. Similarly, the abortionist can enter the clean uterus almost with impunity; but if he fears that the fetus has not been removed, and ventures to invade a second time, he stirs up bacteria introduced at the first instrumentation. High morbidity or mortality after abortion is almost pathognomonic evidence of repeated invasion (or instrumental perforation) of the uterus.

In consequence of these observations, I would urge that repeated instrumentation of the pregnant uterus be avoided; that diagnostic curettage be limited to those cases in which it is definitely indicated, and that supravaginal hysterectomy after curettage be performed immediately or operation be postponed until subsidence of the inflammatory reaction incident to use of the curet.

INFLAMMATIONS OF THE UTERINE ADNEXA

Six years ago, I reported a bacteriologic and histologic study of the fallopian tubes. In a search for dormant infection, cultures of more than 200 pairs of thoroughly ground tubes revealed that it is almost never possible to obtain the gonococcus longer than two weeks after the disappearance of fever and leukocytosis. A coincident study of the gross pathologic changes in this material, aided by clinical inquiry, revealed that a single attack of salpingitis seldom results in marked permanent increase in thickness of the tube wall. Greatly thickened tubes, encountered in patients recovered from acute infection, are almost positive evidence of repeated salpingitis; they occur chiefly in prostitutes and in women whose husbands are carriers of infection.

As a result of these combined bacteriologic, histologic and clinical observations, I came to the conclusion that gonorrheal salpingitis is essentially a self-limited process; that persistently active gonorrhea of the tubes is ascribable to recurrent infection rather than to chronic infection, and that, with reinfection prevented, the tubes should heal spontaneously.

It must be remembered that the gonococcus remains persistently viable in the external female genitalia. On this account, sexual excesses or the employment of high pressure douches predispose to tubal reinfection. In my experience, however, this type of recurrent salpingitis is not common. The chief danger of reinfection comes from male carriers of the gonococcus.

English gynecologists, notably Eden and Maclean, suggest that mixed infection may persist in the tubes despite the fact that the gonococcus soon disappears. My studies indicate that the frequency of mixed infection has been greatly overestimated; bacteriologic investigation of thoroughly ground fallopian tubes, obtained after subsidence of active inflammation of gonorrheal origin, fails to reveal more than the occasional incidence of other bacteria.

After these several years of bacteriologic and histologic work, I adopted, in 1921, a plan which may be termed "absolute clinical conservatism." Operations were almost entirely discontinued for the purpose of eradication of tubal infections. Surgery is resorted to, and frequently, but it is reserved chiefly for the sequelae of disease, notably for adhesions with symptoms and for prolonged menstruation incident to inflammatory lesions of the ovaries. Operations are now directed to reconstruction of tissues laid waste by disease rather than to removal of organs for the purpose of stamping out infection.

A clinical cure is obtained without operation in the great majority of patients, including those who have suffered from more than one attack of tubal inflammation. The aggregate number of operations for relief of the sequelae of salpingitis now amounts to a total of less than 15 per cent. These figures are based on a careful study of thoroughly controlled patients, many of whom were sufficiently ill to require hospital treatment for some weeks before being transferred to ambulatory care.

STERILITY

Sterility is relieved by operation more frequently than in former years, but intervention is rarely advocated for this complaint alone.

For some years, whenever it has been necessary to open the abdomen of patients who are victims of sterility, I have tested the patency of apparently healthy tubes by means of air inflation from within the abdomen. Air distention of the tubes reveals the location of strictures, magnifies lesser pathologic changes, and is of considerable therapeutic value. A peculiar gurgle is heard when air passes through a normal tube into the uterine cavity.

Long ago, Emil Ries described a mechanism of tubal occlusion in which cicatricial contraction of the serosa produces infolding of the fimbriae into the lumen of the tube—a process essentially the counterpart of a purse-string closure. Prolonged observation has convinced me that the Ries mechanism of closure is a frequent one. After complete healing of salpingitis of moderate severity, fimbriae that have invaginated in this manner may often be restored to normal by gentle, blunt dissection with the scissors. Several patients have been relieved of sterility in this way, whereas my results with other plastic operations on the tubes have been decidedly disappointing.

ADHESIONS

The opened abdomen may reveal a veritable labyrinth of adhesions. Despite their number, I almost never see adhesions of gonococcal origin that are not amenable to separation by blunt dissection with the scissors. It may be taken as an almost iron-clad rule that gonococcal infection does not produce a firm union of inflamed surfaces. Adhesions that require tearing or cutting speak strongly for postabortive infection, tuberculosis or endometriosis.

Many years ago, I observed a frequent persistence of pain in the left lower quadrant of the abdomen after apparently satisfactory operation for relief of tubal disease. More intimate scrutiny during the course of operations revealed that many patients with salpingitis have parasigmoid adhesions which easily escape detection and which materially interfere with the functional activity of the bowel whenever there is accumulation of flatus. The routine release of these sigmoid bands has been a considerable factor in decreasing postoperative discomfort.

Raw surfaces which are unavoidably created at operation, and which are too extensive to be protected otherwise, may be patched with omentum. The omental transplant should be considerably larger than the surface to be covered and may be tacked loosely in position by interrupted sutures of fine catgut. I have employed transplants of large size in about a dozen cases. The fate of the transplant is uncertain, but clinical results have been excellent in all except one patient.

REMOVAL OF THE OVARIES

Ovarian conservation is practiced as a routine by most American gynecologists. I would urge more careful consideration of the etiology of the pelvic infection before arriving at a decision relative to the disposition

of a doubtful ovary. Gonococci, according to my experience, do not live long in the tissues of the upper pelvis. Streptococci, on the other hand, remain viable for an indefinite period (I have isolated anaerobic streptococci as long as eighteen years subsequent to the introduction of infection). Therefore, in the presence of a diseased ovary, with the indications for removal somewhat uncertain, more radical surgery appears indicated in streptococcus infections than in gonorrheal disease of equal severity, because persistently viable streptococci predispose to postoperative ovarian infection.

In patients operated on for relief of lesions produced by the gonococcus, I favor preservation of the ovaries unless they are rather badly crippled. If one ovary must be sacrificed, however, it appears inadvisable to resect a major portion of the remaining one. Many times I have been consulted by patients who have suffered for years with partial menopause, a spark of sex vigor being kept alive by a fragment of ovary. Removal precipitates the climacterium and brings relief.

Further, I assume that we all advocate removal of a portion of the uterus in patients subjected to salpingectomy, sufficient endometrium being retained to assure some menstruation. But what is to be our attitude toward conservation of the ovaries in those instances in which disease of the cervix necessitates complete hysterectomy? Frank has demonstrated that the ovarian hormone is present in the blood prior to each menstruation and is excreted with the normal monthly flow. But in young patients who are deprived of a menstruating uterus, the preservation of the ovaries is followed by a monthly accumulation of noxious waste products. Despite this recent evidence, my present attitude is inclined toward conservation of healthy ovaries in young women subjected to total hysterectomy.

THE APPENDIX

Those whose fingers itch to open the abdomen, but who admit that early operation is inadvisable, may make symptoms of appendicitis an excuse for surgical intervention. It is worthy of note that pelvic infection spreads to the appendix from without. Consequently, there is rarely need for intervention because of anticipated gangrene, necrosis or rupture of the appendix. During the last ten years, serious complications due to secondary appendicitis have necessitated emergency operation in only three cases in the gynecologic service at St. Luke's Hospital.

COMMENT ON "SALPINGITIS" OPERATIONS

My views are diametrically opposed to those who advocate operation on patients with acute or subacute salpingitis. As a student I was taught not to remove acutely diseased tubes, and I have been ever thankful for this early training. Experience teaches that our opinions relative to surgical procedure are subject to material oscillation from time to time. But, for me, the pendulum has never been in motion so far as radical operations for acute tubal infections are concerned.

The theme of this discussion is far different: it concerns the desirability of operation during less active stages for the purpose of eradication of persistent gonococcal infection.

My bacteriologic investigation of ground fallopian tubes, admittedly subject to error and to personal bias, has now been extended over a period of eleven years. Six years of "absolute clinical conservatism," combined with this laboratory study, have instilled into me the belief that gonorrheal invasion of the fallopian tubes and adjacent tissues ordinarily produces a self-limited infection; the disease in so-called chronic cases is typically a reinfection—a recurrence rather than a continuous infectious process.

We are asked: What shall we do with those patients who have enormous or persistent pus tubes; with those who give a history of frequently repeated attacks of salpingitis; with those who refuse to live apart from male companions who are carriers of infection, or with those who must work for a living and cannot afford the luxury of prolonged rest and care?

In reply I should say that we have heretofore overestimated the persistence of a single infection and have not emphasized sufficiently the danger of subsequent exposures. Since 1921, it has been my experience that those who avoid cohabitation with carriers of gonococci, and who also shun douches and undue traumatism of sexual intercourse, ordinarily recover from salpingitis with relative promptness. Victims of only one attack of tubal infection seldom have protracted symptoms or reveal extreme pathologic changes. Even those who have been infected repeatedly tend to ultimate recovery if isolated from consorts who are carriers of disease. When a sufferer from salpingitis is informed, frankly, that she must choose between prolonged abstinence and surgical removal of the genitalia, conservatism wins. (Sheath protection is a helpful compromise measure.)

Those who advocate early operation emphasize the shorter period of incapacitation enjoyed by patients subjected to surgical intervention. My experience of recent years indicates that we have been in error in accepting this belief. Convalescence under palliative care is quite as prompt and yields even more satisfactory results in that great majority of cases in which it is the treatment of choice.

Enormous pus tubes, persistent pus tubes, and repeated attacks of salpingitis are almost pathognomonic evidences of reinfection. Exacerbations of symptoms, in the absence of renewed infection, become progressively less severe; the chief exceptions to this are complications, which are rare.

It is not my desire to request invariable avoidance of operation on those patients who suffer from repeated attacks of gonorrheal salpingitis. But I would ask that the danger of reinfection be explained to these patients, and that operation be delayed at least as long as we would advocate if the patient were our sister or our mother. Expectant care eventuates in clinical recovery of the great majority of patients, and is beneficial to those who must ultimately obtain operative relief.

Surgery should be reserved chiefly for the sequelae of infection. The greater the length of time devoted to preoperative convalescence, the greater is the prospect that the operative procedures may be conservative and constructive rather than radical and destructive.

Streptococcus tubal infections occur chiefly after abortion and are persistent. The bacteria usually remain viable in the tissues for six months; two years is not uncommon. A history of abortion, of puerperal infection, of instrumentation with infection, gives a clue to the diagnosis. Early surgery is difficult: the adhesions tend to be firm; postoperative drainage is common, and the morbidity and mortality are high. In these cases, also, postponement of operation appears advisable. It is my custom to delay operative intervention for a minimum of two years. If, eventually, the abdomen is opened, the probable presence of viable bacteria in the tissues indicates relatively more radical procedure than in gonorrheal disease of equal severity.

CONCLUSIONS

1. The treatment of chronic leukorrhea should not be directed solely to the uterine cervix. Skene's duct infections are another important source of these discharges.

2. Establishment of thorough drainage is a factor of greatest importance in the cure of chronic endocervicitis.

3. It appears difficult to invade the uterine cavity without introducing some bacteria. The clean uterus can be entered once almost with impunity, but repeated instrumentation of the pregnant organ is highly dangerous. Supravaginal hysterectomy, performed several days after diagnostic curettage, is an unclean surgical procedure.

4. Operative intervention should be avoided in patients with acute inflammation of the tubes. Nor should surgery be employed, as a matter of routine, for eradication of more quiescent tubal infections. With reinfection prevented, gonorrheal invasion of the fallopian tubes and adjacent tissues tends to produce a self-limited disease. Operation should be reserved chiefly for the sequelae of infection.

5. At the time of operation, a decision relative to the disposition of a doubtful ovary requires most careful consideration of the etiology of the pelvic infection. If of gonorrheal origin, preservation of the ovaries appears desirable unless they are rather badly crippled or the circulation is impaired. If one ovary must be sacrificed, it is inadvisable to resect a major portion of the remaining one. In the presence of a diseased ovary, with the indications for removal somewhat uncertain, less radical surgery appears indicated in gonorrheal disease than in streptococcic or tuberculous infection of equal severity.

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THE USE AND ABUSE OF PHYSICAL THERAPEUTICS *

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Prior to the World War, physical measures of treatment were in rather general disrepute. It is true that through the efforts of Peter Hunter Ling, Metzger, Weir Mitchell, and Douglas Graham, massage had been placed on a sound basis. It was also recognized that it could be scientifically applied:

1. As a means of passive exercise.
2. For its local and general circulatory effects.
3. For the promotion of the lymphatic circulation.
4. For its direct stimulation or its sedation of the nervous system.
5. For the general improvement it might secure in nutrition, and, to a more limited degree, in muscular development.
6. For its value in certain types of ankylosis.

The works of Fraenkel, Franz, and Robert W. Lovett had proved that muscle training or reeducation had a field not only in anterior poliomyelitis and peripheral nerve paralyses, but also in organic nerve lesions, such as tabes dorsalis, the spinal scleroses and some of the hemiplegias.

Physical exercise, thanks to the schools of physical education, had partly emerged from the pseudoscientific theories of the "rubbers," "trainers" and faddists, and was being intelligently employed.

Hydrotherapy, used both internally and externally, was also acknowledged to be of therapeutic value. The studies of such scientists as Galen, Paré, Preisnitz, Winternitz, Brand and Baruch had proved that by hydriatic procedures it was possible, because of its varied range of temperature and pressure, to secure direct nerve stimulation, and by its reflex action to achieve more profound constitutional results. Its sedative action, as in the continuous neutral bath, had been demonstrated in numerous cases of nerve excitability. The value of its drip sheet, its hot and cold compresses and its packs had also been recognized.

In less general use were the mechanical methods of treatment, such as were comprised under the general term of Zander. Later Tait McKenzie refined these procedures and added the element of active exercise and competition.

The lack of physical exercise has long been considered an important factor in disease, and its employment, whether in the form of mechanotherapy, gymnasium, or in properly selected games, such as golf, squash, tennis, basketball, baseball, and what not, has frequently secured prompt renewals of health dividends.

Electrotherapy, however, was especially under the ban. Certain minor effects were conceded, but the blanket charge that its only value was psychologic for some strange reason damned it in the eyes of those who consciously or subconsciously were employing psychology in their daily practice. Despite this, much earnest and careful study had been made and the foundation, based mainly on clinical studies and on empiricism, had been laid. It is not strange that electrotherapy lagged behind. Its supposed mysterious properties made it a choice bait for the quack and charlatan; it was not taught in the medical schools; much that had been written was based on faulty diagnosis, inaccurate observation, and overenthusiasm; it had slight scientific background, and generalizations were made on insufficient data and evidence. A coincidence became a fact. Small wonder that with such tactics the medical sense was profoundly shocked. Except in a few instances, physical therapeutics was not practiced on a broad basis. One man would employ hydrotherapy and rubbing, another scientific massage, a third would use massage and possibly exercise, a fourth would prescribe muscle training and massage, a fifth electrotherapy only, and, saddest of all, there were some who depended on some one subdivision of electrotherapy to relieve all pathologic conditions.

With the advent of the World War a marked change took place. Physical therapeutics was practiced as a whole. The medical profession was taught that this was not a separate cult but was an important adjunct to other well recognized medical and surgical procedures; that its component parts, massage, hydrotherapy, electrotherapy, mechanotherapy, exercise and muscle training should supplement one another, and that in most cases it was folly to attempt to secure results by dependence on only one of its subdivisions. It was also realized that teamwork was a sine qua non for success.

The vast number of cases in the military hospitals accurately diagnosed, both clinically and by the laboratory, skilfully treated and carefully checked as to end-results, helped to place physical therapeutics on a scientific basis. For example, some of the laboratory observations were:

1. The influence of ultraviolet rays on the chemical reactions of the blood, whereby the calcium and the phosphorus content of the blood were generally augmented.

* Read before the Section on Pharmacology and Therapeutics at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 19, 1927.

2. The power of diathermy in suitable cases of nonunion or delayed union of bone in hastening the formation of callus.
3. The more rapid disappearance of calcium carbonate in bursitis with calcification by means of the same diathermy.
4. The increase in basal metabolism under autocondensation.
5. The increase in urinary solids, hitherto deficient, by autocondensation, and at times by the sinusoidal current.
6. The deposition of calcium salts in rickets.
7. The influence of actinic energy not only on the hemoglobin content of the blood but also on the number of red cells, and not infrequently on their differential count.
8. The increase in the alkali reserve under the administration of radiant heat.

The following cannot be reiterated too often: Physical therapeutics should be used only as one of the triad of medicine, surgery and physical therapeutics, and only in connection with its sister members. Bearing in mind that so far the only demonstrable properties of physical therapeutics are comprised under the headings of chemical, mechanical, thermal and psychic manifestations, one should use every effort to apply these properties to the pathologic condition in question. Generally the best results are secured from a prescription combining at least two of the five subdivisions of physical therapeutics—hydrotherapy, electrotherapy, passive exercise in the form of massage, active exercise in the form of gymnasium or games, muscle reeducation, and mechanotherapy (the last strictly speaking a combination of muscle reeducation and gymnasium with the possible added incentive of competition).

INDICATIONS FOR PHYSICAL THERAPEUTICS

Among the pathologic conditions in which physical therapeutics may be of value are: nonunion or delayed union of bone; lower back injuries; adherent scars; bursitis; peripheral paralysis; neuritis; pneumonia; acute myositis; myositis ossificans traumatica; sprains; fractures; arthritis; surgical tuberculosis and tuberculous peritonitis, and various skin conditions.

Nonunion or Delayed Union of Bone.—Here adequate fixation is essential. Given this, diathermy, or diathermy and ultraviolet rays are indicated. Ordinarily, though, diathermy suffices in a fair percentage of cases. Whenever possible the lateral method should be used. If not, the double cuff method, though less efficient and requiring a longer time both for treament and for recovery, will accomplish the same result but with a decreased percentage of success. If the parts are encased in a plaster cast, windows should be cut in its lateral or anteroposterior aspects. One window should be at the upper edge of the fracture, the other at the lower edge. Into these apertures, metal strips should be inserted. In this manner, an adequate heating through may be secured. I have never seen any swelling of the tissues from such a procedure. If after four weeks there still is no callus, a general treatment with air-cooled ultraviolet rays should be added. Its value may be enhanced by the daily oral administration of from 10 to 15 grains (0.65 to 1 Gm.) of some calcium salt.

Lower Back Injuries.—This bugbear of industrial accidents deserves a paper by itself. This is a confession of the relative lack of uniformity of results, which is not strange when one considers that the pathologic conditions may include among other things congenital anatomic abnormalities; arthritis which has been quiescent before the trauma; vertebral fractures (often overlooked); rotated vertebrae; sacro-iliac strain; myositis; periostitis; vertebral tuberculosis; postural defects; ligamentous or muscle tears (the so-called lifting strain), and malingering. Success in treatment depends on the exactness of the pathologic diagnosis. In general, the best prescription is a carefully selected combination varied in time and character according to the changing pathologic phases. These should be selected from support, rest and fixation, on the one hand, and, on the other, from physical therapeutics, such as diathermy and radiant heat, to produce an active hyperemia with its consequent tissue drainage; static wave current, static sparks, sinusoidal current, Bristow faradic, and massage for mechanical effects in restoring muscle tone, and, as soon as possible, active exercise. As in many cases the muscle spasm is the predominant factor, treatment should relieve the spasm; the necessary amount of fixation should be added if indicated; for a short time what may be called general tonic measures should be instituted, and, as soon as possible, proper voluntary muscle exercise should be employed, not only as the best means of restoring muscle tone but also to dispel the mental inhibition that exercise or work is impossible. In short, it is evident that successful results depend on careful and correct diagnosis, and on intimate teamwork between the industrial surgeon and the physical therapist.

Adherent Scars.—Those cases in which operation is refused or is considered inadvisable frequently will yield to the following prescription:

(*a*) Heat, radiant, diathermy, or the whirlpool bath—the latter being the best form.

(*b*) Chlorine ionization, carried out by placing a negative cellu-cotton pad, saturated with a 2 per cent sodium chloride solution, directly over the scar, with the positive pole placed indifferently, though preferably directly opposite, and using current of from 10 to 25 milliamperes from twenty to twenty-five minutes.

(*c*) Massage and stretching with occasional vibration. Occasionally a very stubborn case will respond to the resolvent properties of the roentgen ray.

Bursitis.—This condition, especially of the subdeltoid type with calcification, as a rule promptly yields to: (*a*) diathermy through the bursa and contiguous tissues; (*b*) chlorine ionization through these strictures; (*c*) massage for its local circulatory effect; (*d*) stretching, gentle at first and later, if there is not too much reaction, vigorous. While in many of these cases the patients get well spontaneously without any treatment, if physical measures are employed pain is lessened; the time of disability is shortened, and the percentage of recoveries is increased.

Peripheral Paralysis.—If there is any question of nerve section, a very careful examination for the electric response should be made and its results evaluated with the other clinical signs. If the nerve is severed, operation, followed by physical therapeutics, will afford the best means of securing functional restoration. In general, the treatment depends on: the presence or absence of pain, and the degree of degeneration. It consists of (*a*) heat in some form; (*b*) prolonged galvanism for its nutritional effect on nerve tissue; (*c*) short mechanical stimulation, this being dependent on the degree of degeneration (interrupted galvanism, sinusoidal or faradic); (*d*) short massage with appropriate muscle training, and (*e*) occupational therapy, primarily for muscle reeducation. Ordinarily, in prolonged galvanism, the negative pole should be placed over the nerve trunk or trunks involved as it has greater stimulative properties. If much pain is present, however, it should be replaced by the positive.

Neuritis.—Focal infection should always be sought for and removed if found. The treatment should be individualized. In general, there should be a primary application of heat. This may be radiant heat, dia-

thermy, infra-red rays or the whirlpool bath. This should be followed, dependent on the type of neuritis and the degree of inflammation, by galvanism or the static brush discharge. In cases of extreme nerve inflammation, heat and the static brush discharge may be the only thing that can be tolerated by the patient. Later, careful massage and motion should be used. The latter may be active assistive, active, or active resistive.

Pneumonia.—Diathermic heat is of value in this disease as it diminishes pain, improves transiently the heart's action, and induces sleep. These factors alone make it a valuable adjunct to other standard or routine methods of treatment. I do not believe that diathermy ever shortened the course of this disease, but by relief of pain and increasing the amount of rest it may tide the patient over until lysis or, rarely, crisis occurs. The Brooklyn Naval Hospital employs diathermy as an adjunct in every case as soon as the diagnosis is made. The same holds true at the On-Shore Station of the Boston Floating Hospital. That diathermy does relieve the pain is attested by the fact that in hospitals where it has been used as a routine measure the bills for narcotics have been lessened by at least 50 per cent. At least, diathermy should be considered as a possible adjunct to other treatment. The technic is simple, and I have never found any bad effects on the heart with this procedure. Six by nine electrodes should be placed anteriorly and posteriorly, the posterior one more to the left, the anterior one more to the right. From 1,000 to 1,800 milliamperes may be safely used. It is well to turn the current on gradually, taking three or four minutes to attain the maximum strength. The anterior electrode may be held on by a sandbag, hot water bottle, the hand of the operator, or adhesive plaster. The duration of the treatment should be at least thirty minutes. Treatments may be given as often as indicated, varying from every six hours to once a day.

Acute Myositis.—This is relieved quickly by some form of heat plus some form of active exercise.

Myositis Ossificans Traumatica.—The duration of this condition can apparently be greatly shortened by rest, diathermy and the avoidance of active manipulation.

Sprains.—Diathermy is a good treatment to promote an active circulation with consequent drainage. This should be followed by some one of the following mechanical stimuli: massage, static wave current, the sinusoidal current, the Bristow coil or static sparks. After the treatment has been finished, adhesive strapping should be used to hold what has been gained. Treatment should be repeated daily until recovery.

Fractures.—Despite certain published reports, physical therapeutics intelligently used is of the greatest benefit. The wage earner is little interested in being told "that his bone has knitted" if, because of lack of functional restoration, he is unable to work or can do so only with difficulty. Delayed union or nonunion has already been discussed. Heat (radiant, infra-red or diathermy) is valuable to relieve pain, to promote a more active local circulation, and to secure a certain degree of muscular relaxation. This should be followed by careful manipulation. Passive exercise should be either tabued or used with extreme caution, as a heavy handed technician can easily cause displacement or refracture. Active assistive exercise, on the other hand, is of great value. As the condition improves, active resistive movements should be employed. If there is nerve injury, galvanism and some of the mechanical currents may be indicated.

Arthritis.—In the consideration of this pathologic condition it is presupposed that the requisitive careful physical and laboratory examinations have been made, and that, where foci of infection may be a causative factor, they have been removed. Symptomatic cure is frequently attained by the use of diathermy and galvanism, and at times by the addition of autocondensation. Pain is generally relieved. If there is no mechanical obstruction, motion becomes free. Although this improvement may be permanent, in some cases the symptoms return from eight to sixteen months later; as a rule, however, the same relief as before can be attained.

Surgical tuberculosis and tuberculous peritonitis are frequently benefited by ultraviolet rays, as are also indolent wounds, discharging sinuses and leg ulcers.

In herpes zoster a general air cooled ultraviolet ray treatment seems to be almost specific. Ultraviolet rays in such dermatologic conditions as acne, and in certain forms of eczema, sycosis and tinea, frequently work brilliantly. In psoriasis the patches may disappear, but they are apt to recur.

Acute traumas, especially those received on the athletic field, respond quickly to physical therapeutic measures, varying from a preliminary packing in ice to diathermy, radiant heat, whirlpool bath and massage.

Certain types of asthma and bronchitis also are ameliorated by ultraviolet irradiation and diathermy.

The functional neuroses often show a lowered calcium and phosphorus blood content. General air cooled ultraviolet rays in addition and generally some form of high frequency not only have a strong psychologic effect but also seem to have a real curative value per se.

It is not my intention in the foregoing list of pathologic conditions to infer that only physical therapeutics should be used, nor do I wish to give the impression that physical therapeutics should be used in all these cases, as not infrequently standard means of treatment will achieve the same results. In the main, it is only in those cases which are resisting the ordinary methods of treatment that physical therapeutics should be employed.

ABUSE OF PHYSICAL THERAPEUTICS

Some of the abuses of physical therapeutics have been mentioned in the first part of this paper. I will, however, reclassify and discuss them as a whole. Much that has been written, especially in the earlier days, was based on faulty diagnosis, inaccurate observation and overenthusiasm. There was little scientific background and many generalizations. Facts were deduced from very few cases.

With the advent of the laboratories, teamwork with the other specialties, and an infinitely larger number of cases carefully checked and studied, these defects are being remedied. Overenthusiasm, however, is still rampant in some quarters. The increased intelligent use of physical therapeutics by the profession is the answer to the challenge of the cults.

As has been stated before, it is an abuse of physical therapeutics to use it except: (1) after a careful physical and laboratory examination; (2) as an adjunct to other standard and well recognized procedures; (3) in teamwork with the other branches of medicine and surgery; (4) after a definite attempt is made to apply the proper physiologic effects to the predetermined pathologic condition, and (5) when every care is taken not to use it in place of other proved methods that may be superior.

The paucity of postgraduate and undergraduate instruction in the medical schools has placed the profession at a disadvantage. This explains much of the former medical opposition, for, as has been well stated, "what a man is least up on, he is most down on."

Many attempts, some good, some bad, have been made to remedy this deficiency. In general, it is evident that a subject as intricate as physical therapeutics, more particularly electrotherapy, requires more study than a salesman's say so that if switch J is snapped on and button 606 is used, all the ills that human flesh is heir to will melt and flit away to the great financial benefit of the physician in question. The commercial courses sponsored by numerous manufacturers of electrical apparatus were equally inadequate. These generally consisted of from eight to twelve lectures—occasionally there was added a so-called clinical week. Some of these reeked with commercialism; others were good as far as they went. But even here, consciously or subconsciously, there was a natural tendency to evolve a technic which was applicable only to certain features of the apparatus in question. Despite this, most of the manufacturers were actuated by a sincere desire to teach their customers methods by which they might attain good results. Courses of from one to six weeks, sponsored by reputable medical schools, are, of course, frankly makeshifts; but they do serve to show the would-be physical therapeutist the breadth of the subject, and to make him realize that all he can hope to acquire in so short a time is familiarity with the purely mechanical details of the technic and the broader physiologic groundwork on which, aided by his medical knowledge and common sense, he can attempt to erect his physical therapeutic superstructure. At the instance of the Council on Physical Therapy of the American Medical Association, not only is more attention being paid by the medical schools to postgraduate and undergraduate instruction in physical therapeutics but also medical societies are devoting parts of their programs to papers on these subjects.

Only physicians trained in physical measures should be assigned to take charge of departments of physical therapeutics. This obvious fact has too often been ignored by insurance companies and large employers of labor. As a consequence, the results do not justify the expense, the clinic degenerates into a mere "bake and rub" proposition, and well trained technicians become discouraged. The result is that either they deteriorate in their work, or, as generally happens, they resign from the clinic.

Technicians should be discouraged from running offices of their own. To quote from a report of the Council on Physical Therapy:

> The treatment of disease, whether by drugs, surgery or physical agents, belongs solely in the realm of medicine. A physician would not refer a patient to a nonmedically trained technician for treatment by either drugs or surgery; yet many physicians may refer patients to technicians, masseurs, gymnasts or nurses who have received training in physical therapeutics, or even to members of various cults, for physical therapeutic treatment. Therefore, physical therapeutics must be recognized as a component part of medicine, and patients requiring this type of treatment should be referred only to physicians trained in this specialty.

Electrosurgery occupies an important field in selected cases. It has a technic exacting and peculiar to itself; yet many surgeons who would not think of attempting a purely surgical operation without infinite attention to detail will, without any previous practice on dead tissue or animals, boldly invade this field.

It is also an abuse not to employ physical therapeutics when it is indicated. It is not enough to secure bony union in a fracture or to operate successfully from a surgical standpoint if, as a result of the nonuse of physical measures, functional restoration is not secured. It is an abuse of physical therapeutics for a powerful surgical society to condemn the use of physical measures in fractures when on analysis of the report it is self-evident that two important factors have been overlooked: first, that in many cases the surgery was so poor that treatment by physical therapeutics or by anything else could not have overcome this handicap; and, secondly, that in many cases physical therapeutics, to state the fact mildly, was unintelligently prescribed and applied.

Many insurance companies specializing in industrial compensatory insurance have rightfully complained that in certain localities the results attained did not justify the expense. It was to guard against this that the Council on Physical Therapy said:

> A physician who has installed a diathermy machine or an ultraviolet ray generator can do good in carefully selected cases with one of these methods. He is not, however, fully equipped to render physical therapeutics. As a rule, it is the careful combination of several physical agencies that gets the best results.

There is another danger—the treatment habit. This applies both to the physician and to the patient. It is prevalent in general practice, and it reaches its zenith in the departments of physical therapeutics of civilian hospitals. In the past, all undesirables and incurables were dumped on this department. Many of these patients felt better for the time being—also something tangible was being done for them—and as a result the department became cluttered with patients who had attained the maximum improvement, to the great disadvantage of the acutely ill urgently needing such treatments as an aid to shortening their time of disability and insuring their functional restoration. Under most industrial compensation laws this treatment habit, unless great care is exercised, is apt to become firmly fixed. The extravagant claims of some of the manufacturers as to the wonderful results to be attained, and especially the financial returns to physicians, has resulted in loading many a practitioner to the gunwales financially, and as a result he has been tempted to treat every case with physical therapeutics whether such treatment is indicated or not, thus violating the principle of not employing physical therapeutics in cases in which some standard procedure, less time-consuming, and less expensive to the patient, would afford as good, or better, results.

Dangers lurk in the indiscriminate application of this form of therapy; dangers due to the ignorance of conditions in which it is indicated; and dangers of wanton and premeditated intent to deceive. As in other adjuncts to curative measures it is an appeal to the spectacular, and a not overmodest practitioner might be inclined to capitalize on the credulity of his patients. Rightly applied, however, it can do great good. The Council on Physical Therapy can do much to limit this abuse and firmly fix in the medical mind its scientific possibilities. With this in view the Council has written, "The Council on Physical Therapy of the American Medical Association will endeavor to point out to the medical profession the advantages and disadvantages of physical therapeutics, so that its abuse may be reduced to a minimum and its scientific possibilities may be appreciated."

520 Commonwealth Avenue.

ABSTRACT OF DISCUSSION

DR. RICHARD KOVACS, New York: For the last six years I have been in charge of the physical therapy department of the Reconstruction Hospital, which is one of the few civilian hospitals started immediately after the war with the special point in view of applying the lessons learned by the war. I can corroborate all that Dr. Granger has said about the uses and abuses of physical therapy. We are employing all these subdivisions of physical therapy in proper correlation and in cooperation with the entire staff of the hospital. Many of the orthopedists and medical men think that while they do not know much about physical therapy they might just as well fall into line. They employ so-called technicians, start a department and turn it over to a nonmedical person, expecting him or her to run it. That is a great mistake. While such a person must be well trained, she must work only under a physician who is familiar with the work and can give exact instructions. A physician cannot call himself a physical therapist because he has a few pieces of apparatus. It takes study, time, proper equipment and space to carry out all round modern physical therapy. There is a great deal of additional experimental work needed, and considerable housecleaning is being done among the men who call themselves physical therapists. We need the cooperation of other medical men in order to advance properly this important part of therapeutics. Some dangers of the situation are illustrated by the new medical practice act of New York, in which there is a provision licensing lay persons as physical therapists. They are allowed to open their own offices, and are supposed to treat under physicians' orders. To prevent such possibilities in other states, medical men should cooperate with physicians who want to do physical therapy properly; otherwise the situation of a growing cult will face them.

DR. F. A. DAVIS, New York: Dr. Granger organized this work in the army but did not do it without sufficient training. He had already been in the work about ten or twelve years. He and I were associated in one institution in Boston for seven years. Three or four years ago, a number of us organized the American Academy of Physiotherapy, which has held regular meetings since then.

EPIDEMIOLOGY OF RURAL TYPHOID*

D. G. GILL, M.B., D.P.H.
MONTGOMERY, ALA.

Typhoid has been steadily decreasing throughout the United States, but unfortunately is still a major problem in the Southern states. The death rates and total deaths from this disease in Alabama during the last decade are shown in chart 1.

TABLE 1.—*Distribution of Typhoid Cases in Population Groups*

Group Number	Division	Number of Towns or Cities in Group	Population (1920 Census)	Number of Cases 1924-25	Case Rate per 10,000 Population (Mean)	Percentage of Total Cases
1	County and unincorporated towns	..	1,664,868	1,471	5.2	44.23
	Incorporated towns and cities:					
2	300- 1,000 pop....	60	52,963	462	44.3	11.73
3	1,000- 2,500 pop....	56	105,767	627	30.7	16.19
4	2,500- 5,000 pop....	21	85,635	309	18.0	7.85
5	5,000-10,000 pop....	8	59,498	196	16.5	4.98
6	10,000-25,000 pop....	7	99,293	234	11.8	5.95
7	Over 25,000 pop.....	3	283,047	357	6.3	9.07
	Total.....	155	2,348,174	3,936	8.4	100.00

An analysis[1] of the location of cases and deaths during 1924 and 1925 has shown that it is the small town and strictly rural districts that supply most of the cases. The highest rates occur in the towns with populations under 1,000, while 80 per cent of the typhoid occurs in the rural areas and towns with populations up to 5,000.

Conditions favoring the occurrence and spread of the disease in this section of the population are of interest. Water supplies, milk supplies and sanitation are naturally the first considerations.

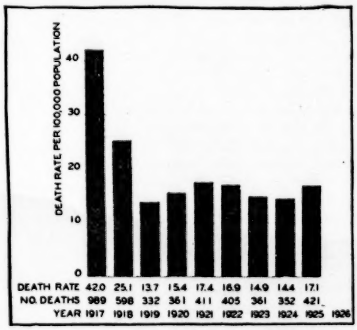

Chart 1.—Total number of deaths and death rate per hundred thousand of population from typhoid in Alabama.

Water supplies as a rule are not community supplies except in the larger places. Wells of varying depth are the usual source, and they are not protected against contamination. Bacteriologic examination of this water shows the presence of gas-forming bacilli in probably 90 per cent of the cases.

Milk, again, is usually a family supply when used, but in a great part of the population it is not a common article of diet and probably plays a small part in transmission.

Sanitation is very definitely poor. Surveys of a number of Alabama towns have revealed that more than 50 per cent of the homes do not have sanitary privies or sewer connections.

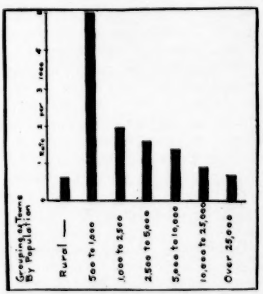

Chart 2.—Typhoid morbidity in Alabama in 1925 by population groups.

With defective sanitation and with careless supervision of typhoid cases, it is easy for the disease to spread, and this direct spread from case to case is the most common cause of typhoid. Most of the so-called epidemics of rural typhoid are found on investigation to consist of one or two original cases and a chain of contact cases.

In searching for the source of these original cases and of sporadic cases that do not give a history of contact with a clinical case, the question of carriers naturally arises.

* Read before the Section on Preventive and Industrial Medicine and Public Health at the Seventy-Eighth Annual Session of the American Medical Association, May 19, 1927.

1. Leach, C. N., and Maxcy, K. F.: The Relative Incidence of Typhoid Fever in Cities, Towns and County Districts of a Southern State, Pub. Health Rep. **41**: 705 (April 16) 1926.

In 1923 and 1924, a carrier survey[2] of the dairy industry was carried out in connection with the adoption of the state-wide milk sanitation program of the United States Public Health Service. Repeated examination of feces and urine were made on 1,076 persons. Of these, thirty-nine were found to be carriers of typhoid bacilli and sixteen to be carriers of paratyphoid A or B. This gives a total rate of 5.1 per cent, or a rate of 3.6 per cent of typhoid carriers only.

TABLE 2.—*Sanitary Survey of Alabama Towns*

Number of Towns Surveyed	Total Population Surveyed	Number of Homes Inspected	Number of Homes with No Privy	Number of Homes with Insanitary Privy	Percentage of Homes without Privy or with Insanitary Privy
16	31,109	7,608	537	3,943	58.89

This high rate in a general adult population led to the examination of a group of patients who had recovered from typhoid to determine the percentage of permanent carriers. Three hundred and forty-eight individuals who stated that they had had typhoid, or a continued fever of several weeks' duration, have been examined at least three times. The time elapsed between convalescence and examination varied from twelve months to thirty-five years. All these patients, therefore, can be considered beyond the temporary carrier stage.

The original diagnosis was taken entirely from the history and undoubtedly includes some other diseases. For example, twelve carriers of paratyphoid A or B were found but are excluded from this series. Therefore, the 9.48 per cent found to be chronic typhoid carriers probably represents a minimum percentage.

In a community which has had a high typhoid morbidity rate for years, it is natural to expect a high carrier rate, and surveys have shown that this is correct. In the accompanying map of a small town in Alabama are shown the location of old cases of typhoid and the location of carriers found. In a population of 1,733, there were located 155 old cases of typhoid; of these, eighty-four were examined for carrier status and nine found to be positive.

Therefore, in any community that has had a high typhoid morbidity rate there are a number of potential sources from which fresh cases can arise. Not all these carriers cause typhoid, but their presence in a community with defective water supplies and defective sanitation cannot be ignored in searching for the source of new cases.

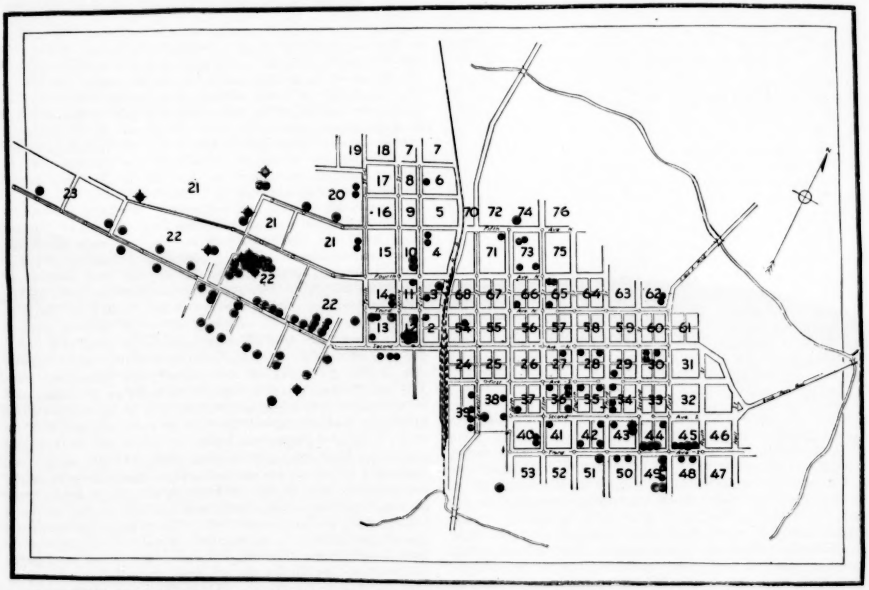

Chart 3.—Typhoid investigation, June, 1926, by the Alabama State Board of Health. Lines indicate sewers; circles, manholes; black dots, location of persons who have had typhoid; black dots in circles, persons recovered from typhoid examined for carriers; black dots in circles with cross, carriers.

TABLE 3.—*Examination of Three Hundred and Forty-Eight Patients Recovered from Typhoid for Permanent Carriers*

	Number Examined	Number Carriers	Per Cent	Fecal	Urinary
Entire group	348	33	9.48	25	8
Males	150	14	9.3	9	5
Females	198	19	9.6	16	3
Whites	169	20	11.8	15	5
Colored	179	13	7.3	10	3
White male	85	11	12.9	8	3
Colored male	65	3	4.6	1	2
White female	84	9	10.7	7	2
Colored female	114	10	8.8	9	1

2. Welch, S. W.; Dehler, Sophie A., and Havens, L. C.: The Prevalence of Typhoid Carriers in a General Population, J. A. M. A. **85**: 1036-1038 (Oct. 31) 1925.

During 1926, in the study of rural outbreaks, sixteen carriers were located, some of whom were undoubtedly responsible for the cases in their community.

SUMMARY

Typhoid is still prevalent in the Southern states. In a rural state, most of the typhoid is rural with the highest rates in the small towns.

Sanitation and water supplies are defective in this group. Typhoid carriers are common. Approximately 10 per cent of those who have had typhoid become permanent carriers, and are probably the source of most rural typhoid.

519 Dexter Avenue.

ABSTRACT OF DISCUSSION

DR. S. W. WELCH, Montgomery, Ala.: I just want to say to you state health officers that if you want to get anything done, collect around you a bunch of wild colts that are ready to run away with the cart and tear it to pieces, if need be—fellows that will run. Don't get a fellow who is tame and gentle and extremely docile, because he won't work. I am a great lover of bird dogs. I have never seen one worth while that would stay with the horse. If you get a fellow that you have to shoot a time or two to bring in, he will deliver the goods when he finds out what is expected of him. When I first started in this business down there all I had to recommend me was a knowledge of the state of Alabama and its needs, a wholesome knowledge of what I did not know and the ability to choose youngsters who did know. About all that one needs to be a successful administrator is to be able to do one's end of the job so well that the boys won't find out how little one really knows. I got Maxcy, Leach, Havens, Gill, Graham and others like them, put them to work, and kept them so busy that they really have discovered some things. It was shown in the first chart that the morbidity fell in a most spectacular sort of way the first two years. That was due to the control of the municipal water supplies and the sanitation of the no man's land zone that surrounds every town, and the complete sanitation of the larger centers of population.

DR. H. G. GRANT, Richmond, Va.: In common with other states, we have had a decrease in our typhoid rate, from 33.91 in 1919 to 10.6 in 1926. For the last five years it has been practically stationary. After having read the results of a very interesting study on the exact location of typhoid, according to deaths and cases, we made a study of a similar sort in Virginia. We could not check up on cases. Our reporting system is not really good enough to make the study worth while. However, our deaths are reported accurately and are reported from the exact location of the patient. This study bears out exactly the study conducted in Alabama by Dr. Leach and Dr. Maxcy. Our rates are slightly lower, but the sequence is exactly the same. In 1925, the rural rate was 13.7. In towns of from 500 to 1,000 population the rate jumped to 27.8; in towns of from 1,000 to 2,500 it came down to 17; in towns of from 2,500 to 5,000 it still remains at 17. Here is something that can, perhaps, be explained by the small populations. In towns of from 5,000 to 10,000 population, the rate goes to 21. In general, our figures check up with those for Alabama. In towns of 25,000 and more, the rate is 6.1. The total number of deaths for 1925 in the state was 299. The total number of deaths occurring in the rural sections and in small incorporated towns with a population up to 5,000 was 241. In towns and cities of from 5,000 and up, there were fifty-eight deaths out of a total of 299. That is to say, the percentage of typhoid deaths in the rural and small towns was practically 80 per cent of the whole number. Virginia has a total population of 2,500,000 people. About 1,500,000 live in distinctly rural sections, with a population of less than 500. The group which we seem to condemn so severely is the group with population ranging from 500 to 5,000. It would be very interesting if we could estimate the floating population of these towns. It is my opinion that when more work is done on the incidence of typhoid carriers, the rate of approximately 10 is going to be accepted. However, I feel that the difference of opinion which exists today is chiefly due to the fact that a different technic is used. The rate in the general population varies, of course, with the previous incidence of typhoid, but the rate of 3.9, or, including paratyphoid, of 5 is pretty high as a percentage of carriers that would obtain in a general population.

DR. EDWARD S. GODFREY, JR., Albany, N. Y.: It would be rather unfortunate if we generalized from the Alabama figures. The question of climate must be considered. In New York state our highest average case and death rates from typhoid for the past ten years have been in the group of cities with from 10,000 to 20,000 population. A study of typhoid by population groups was made in the annual report of the state department of health for 1917, and in the report for 1925 figures covering the period from 1915 to 1925 are made available. With the exception of cities of more than 200,000 population and the truly rural section, the small village group in New York state is the one that has the least typhoid. Also, I question whether our percentage of carriers is really as high as it has been found to be in Alabama. I admit that there is the possibility that the medium used in the collection and transmission of specimens to the laboratory employed in Alabama may be better than that in New York; yet Dr. Arnold's paper suggested the possibility that it depends on something else. We have made numerous examinations of our food handlers in state institutions, and have found the work so unproductive of results that we regard it as uneconomical to continue it as a routine. I do not think that detection of a carrier is merely a question of the number of specimens submitted. We have had numerous specimens submitted from some of our suspects. On the other hand, we have examined as many as eight specimens from a known carrier before obtaining a positive reaction. It is absolutely impossible to obtain any such number of specimens per individual in a search for carriers, even among food handlers or dairy workers, which indicates the difficulty if not the futility of trying to reduce typhoid through the discovery and control of carriers. The one thing that I do not understand, even on the basis of Dr. Arnold's hypothesis, is the frequency of the urinary carrier in Alabama. We have had only one urinary carrier among more than 300 fecal carriers, despite the examination of numerous specimens. In Alabama, about one-third as many urinary carriers as fecal carriers have been found.

AUBREY H. STRAUS, Richmond, Va.: I, too, have been interested in the carrier proposition and have undertaken our investigation in a slightly different way. We compared the glycerin method of fecal collection, which is used in most places, with brilliant green bile. We tried to test patients who would give positive results. We did obtain a slightly higher percentage of positive results by the brilliant green method than we did by the glycerin method. On the other hand, we found that the glycerin method was vastly superior for organisms of the dysentery group. I cannot but feel, in view of the vastly different results that most of us have obtained in other states in regard to the percentage of convalescent and normal persons who carry the typhoid bacillus, that this work needs confirmation. I do not mean by this to question in any way the accuracy of Dr. Havens' work, as I have every confidence in Dr. Havens, but I do feel that when the rest of us have been, up to the present, unable to get results that even simulate those obtained in Alabama confirmation is needed very badly. Let us concede that we have in Virginia 1 per cent of the normal population as typhoid carriers. That would be cutting the percentage found in Alabama almost to one fourth, and yet it would give us ten carriers for every case in the state of Virginia. To me this is inconceivable. If we cut this further to 0.1 per cent, we would still have more than one carrier for every case. We must face these facts, and before we jump to any conclusions as to the number of our carriers, much additional work must be done. There is something radically different somewhere in our methods and results, and some of us must endeavor to find out why this difference exists. It is true that regardless of how much typhoid we have, some persons remain carriers. Every time there are 1,000 cases of typhoid,

a certain number remain carriers. Whether this number is 10 or 100, it means that a section that has had typhoid for a number of years is presumably going to continue to have more typhoid than another section that has been free from it during the same period. We have found in Virginia endemic foci of both typhoid and paratyphoid B. In the case of paratyphoid B, these endemic foci have been especially pronounced. In one section, paratyphoid B has occurred year after year for more than twenty years. Several carriers have been located in this section, and it is our belief that carriers there are quite numerous. Dysentery does not concentrate in one section like typhoid and paratyphoid B, but appears in many. It is interesting to note that up to the present the dysentery carriers found have not, with one exception, been permanent carriers. Failure to find permanent carriers in dysentery would seem to conform to the way the disease distributes itself; the permanence of the carriers in typhoid and paratyphoid would likewise seem to conform to the tendency of these diseases to remain in the same localities.

DR. SENECA EGBERT, Philadelphia: As to the sporadic carrier in the rural district, I do not know how many may have had the following experience, but I think it is possibly not at all an uncommon one. A case of typhoid occurs in the country. The isolated farm people have been using the well water for years and there has been no typhoid in that time. The mystery is as to where or how the present case of typhoid originated. If we have anything like the percentage of typhoid carriers stated by Dr. Gill, 10 per cent among the cases occurring, it can easily be seen how a typhoid carrier who is a casual visitor at the isolated farm house might be the cause. I can easily conceive that there might be ten carriers to every case and that nine carriers out of ten might not in the course of a year cause a single case, but there is a big chance that one out of the ten might in the course of a year. I therefore think that the relation of the typhoid carrier to the sporadic case is important. It may not be a very great factor in the sum total of the year's cases, but it is worth taking into consideration.

A. W. HEDRICH, Baltimore: Through the courtesy of Dr. Louis I. Harris, commissioner of health of New York City, I was able recently to study the records in his department covering 10,000 cases of typhoid and about 275 carriers. Following are some important differences between the results in Alabama and in New York City: In Alabama nearly 10 per cent of the recovered cases are reported positive after six months; in New York only 1.9 per cent, or about 20 per cent of the Alabama rates, are so reported. In Alabama, these rates of carrier production are about the same for males as for females; in New York City, the female rate of carrier genesis per hundred recoveries is about 2.5 times the male rate. In New York this genetic carrier rate increases sharply with increasing age, being about ten times as high at 50 as at 20; in the Alabama data it is difficult to trace any rise in the rate after 5. The conflicts between the Alabama data and the earlier results seem very striking, and yet I believe that we should be slow in throwing out either set of results as spurious. Science frequently advances by the explanation of exactly such conflicts as these. It seems difficult to believe that the prevailing laboratory technic has been only 20 per cent efficient in diagnosing really typhogenic discharges. Every epidemiologist here has had the experience many times of finding a clump of cases strongly suggesting carrier infection, and when specimens were collected and investigated one usually found the carrier on the first examination. This could scarcely have been done if one's analytic technic had failed one 80 per cent of the time. Is it possible that the Alabama procedure is so sensitive as to include carriers of only slight pathogenic import? Thus, Havens, I believe, reported the recovery of typhoid from stools artificially seeded with less than five typhoid bacilli per gram of feces. It would require a heavy dose indeed of such a stool to produce infection, even granting that only a single typhoid bacillus was needed. Again, Falk reports indications that the Widal test is most sensitive to typhoid bacilli of least virulence. Is not a similar tendency conceivable in the case of the Alabama technic? Further research is clearly needed before the Alabama results can be weighed or interpreted. Certainly, it would seem unwise to reject them merely because they upset existing notions. The whole subject must be more clearly understood before a rational program for the final eradication of typhoid can be constructed.

DR. H. C. STEWART, Nashville: We were also inspired by the excellent report of Dr. Leach and Dr. Maxcy on the incidence of typhoid in towns and cities of various sizes. We very closely paralleled their work. We also noted a slight rise in the mortality in towns of from 2,500 to 5,000 population. I do not know how to explain that, but it seems to be constant in the three states Virginia, Alabama and Tennessee. Practically 67 per cent of our population is in the group of the lowest incidence. The next population group is the 500 to 1,000 class, and that is where we are going to have to aim if we are going to get the typhoid incidence reduced. It includes a smaller number of persons but it is a very diffuse and dispersed problem. I do not know how we are going to get at it unless we have some state-wide activity that will take in all the towns, whether in the mountains, flats or what part of the state. It seems to me that we must get some practical means of applying the sanitary measures that are going to curb typhoid largely in the rural areas.

DR. S. W. WELCH, Montgomery, Ala.: I am very much obliged to the gentleman from Virginia for his frank and constructive criticism. I never got anywhere in my life by compliments and praises for the things I did. The man who has helped me is the one who has pointed out to me the mistakes which I have made and suggested how to correct them. I wish these results would be checked in Virginia, Tennessee, Georgia, Massachusetts, New York and anywhere in the West. I should like to see them verified. When Dr. Havens made his report, it was so much out of line with what had been discovered in Washington and other places that I had to kid him along. He had not been with me more than two years. The experience that I had in my early days in training bird dogs came to my mind. I took the matter up with the Surgeon General, and asked that he send Dr. Lake, who had been in my laboratory before, and whom I knew to be an accurate man and a straight thinker, down to Alabama. Dr. Lake at that time put off coming for two months, and by that time I was in a perfect fever of excitement over the thing. I had to say something; I had to do something. I wired Colonel Russell of the International Health Board, one time of the army, to check it up. He sent Dr. Sawyer down, and Dr. Sawyer checked the work over, and then suggested that all the specimens be submitted to the army laboratory at Washington, and to Dr. Jordan's laboratory at the University of Chicago. Duplicates were made of all the specimens, and they were submitted to these two laboratories. So far as those cases that Dr. Havens reported on are concerned, they are right. We might check the results and start over again, and we might find something different, but they have been checked up by the most competent authority in the United States. I tried to get a man from the United States Public Health Service whom I knew personally and in whom I had perfect confidence, but I could not get him, and the service could not furnish a man at that time. The only reason that the United States Public Health Service did not check the results in my office was that the man was sick. As far as these specimens are concerned, they are right. Your criticism is well founded and I appreciate it, and I hope you will check our results. We challenge you to check them.

DR. D. G. GILL, Montgomery, Ala.: I have very little to add to what has already been said. Dr. Godfrey brought up the question of climate. That is something that is new to me. I was much interested in Dr. Arnold's paper this morning on the influence of heat. It may open up possibilities, but we have nothing to offer as to that. Evidently the report of the carrier work is what has aroused the greatest amount of interest and considerable opposition. We rather expected that when it was offered, and we certainly would be very glad to have that work confirmed or disproved in other places. As Dr. Welch stated, our cultures have been definitely proved in outside agencies to contain *Bacillus typhosus,* and all of our carriers have been checked up, so that our results are all right. We stand behind them, and we hope that this work will stimulate a similar analysis in other places.

THE OPHTHALMOLOGIC NEEDS OF THE INTERNIST *

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I think there can be no question that the field of ophthalmology is the best tilled and best understood branch of medicine. More than in any other specialty, ophthalmologists have probably most nearly exhausted the field. Ophthalmologists, more fully than any others, have met their problems and solved them so far as their solution is humanly possible with the light that science and art now afford.

Most of us look on ophthalmologists with envy. There is no sheaf of death certificates lying in a drawer of their office desks. In considerable part they can see what they are doing; and while their work demands a degree of finesse and a high grade of technical skill approximating that of the artistic violinist, they perhaps more than most of the profession are able to prognose and to accomplish according to a standard which few internists can undertake to equal.

I sometimes wonder whether the very concentration of the work of ophthalmologists and the relatively narrow field to which it is applied does not make them feel like Alexander, and that they sometimes wish to go, like Caesar, over into some newer and more unknown Gallia. I hope that I may suggest some such new conquest in the few remarks that I make.

Perhaps it is this very completeness of the ophthalmologist's knowledge that leads me to come here today with something of a complaint, with a call out of Egypt, as it were, for the help for which St. Paul appealed.

Ophthalmologists have in no small part contributed to medicine in general. Their methods and accomplishments have been incalculable in value to the whole field of medical science. They have made themselves indispensable to the neurologist, for, in the words of the poet, the ophthalmologist has mastery, as it were, over the "window of the soul." Internists have stolen somewhat of the ophthalmologist's thunder, for where is the internist who would pretend to represent adequately the study of circulatory or renal disease, diabetes or gout who does not obligatorily carry in his consulting case that marvelous little instrument which enables us nearly to peer into the most vital mechanism of the central nervous system?

In yet another direction ophthalmologists are to be congratulated. Their work is so open, so obvious, so striking and the demand for near perfection so great that it, more than any other field, is that which the untrained and unskilled will, perhaps, avoid most definitely.

A fault lies with the perfection of the skill of ophthalmologists. So technical have they become, so independent in their methods, that they have, to some extent at least, in part divorced themselves from the general profession. They, more than most, are independent from the other branches of medicine, at least in the opinion of the lay public, and therefore have perhaps mingled less with the internist professionally, less with the surgeon, the urologist or dermatologist, than we who call ourselves internists.

There is only a narrow line of cleavage between the general practitioner and the internist. The latter may be really considered as a general practitioner who has entirely eliminated the surgical art from his practice, though by no means may he ever eliminate from his knowledge some familiarity with the science of surgery, to which he must often delegate his therapeutic tasks, and with even the technic of which he must retain a considerable degree of familiarity.

With ophthalmologists, the highly specialized technic and type of work causes it to be such that all too little of its methods and purposes are comprehended by the general man. This in a way throws ophthalmologists perhaps too much away from the needs of the general profession and, in some respects detrimental to them, separates them too far from it and the problems to which they might perhaps contribute more, were there a closer bond of need apparent between ophthalmologists and internists.

My purpose in this paper, then, is to redeclare the dependence of internists on ophthalmologists and their science and art, and at the same time to emphasize some of the facts, well understood and commonplace to internists, which are of bearing on the work of the ophthalmologist, from which a clearer understanding on the part of the ophthalmologist might assist both to a better comprehension of several problems of importance and interest to us all.

It is always well for us to comprehend the basic fact that no organ or system of the body stands independent from all others, and that the most minute functioning of any integral part of this very complex system is often of great importance to the whole. To cite a commonplace example, there is the close relationship between the gastro-intestinal tract, particularly of the familiar symptom of nausea, with disturbances of vision.

I wish to call attention to the problem of the occult infections, a subject that is now of paramount interest to the profession, if one may judge from the tremendous amount of recent literature on the subject. So direct and so easy of detection and correction are the occult infections originating from the tonsils, the sinuses and the teeth that the relative importance of these sources of infection has become such that outside the field of general medicine all too little attention is paid to the other numerous and quite as frequent occult foci of infection existing elsewhere.

The internist is alone likely to recall that occult infections originate with at least equal frequency from the gallbladder, the other sinuses of the skull, such as the mastoid, from the intestinal tract, the endocardium, the bronchi, the joints and bones, and the numerous possible foci in the genital tract of either sex.

The internist realizes that the probable source of any occult infection can be surmised only by the careful exclusion of these other numerous possible foci, and it is always saddening and a discredit to the profession to have promises of relief of disease and symptoms from the obvious and simple removal of suspected teeth or tonsils, when the more probable seat lies frequently beyond the reach of medicine, perhaps in the endocardium. Hence it is that I always regret it when specific recommendations are sent me, unless indeed the specialist has himself carefully considered and eliminated these other numerous possibilities. It has always seemed sufficient to me when the ophthalmologist states in his report on any case that the eye status suggests the possibility of some occult infection as etiologically concerned.

The internist is, as a rule, much concerned as to the ophthalmologist's opinion of the possible or probable relationship which the eye lesion bears to general disease in order that he may then search for and eliminate

* Read before the Section on Ophthalmology at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 19, 1927.

any such general factor. He is not as a rule particularly concerned with the mere mechanical defects of vision present, for he relies on the ophthalmologist to prescribe the proper measures for their correction, but he does very much appreciate an opinion from the ophthalmologist as to the probable relationship which any eye condition may bear on general disease or on the probable productions of symptoms or signs which are likely to be thought due to some general process.

This presupposes, of course, a broad knowledge on the part of the ophthalmologist of symptomatology and general disease; but this is a knowledge which the ophthalmologist is properly supposed to have, and, coming from a specialist in the diseases of the eye, it bears a particularly significant message to the practitioner.

Too frequently I find that we send our cases to the ophthalmologist without a shred of history. I believe that this is sufficient grounds for a proper resentment on the part of the specialist. Were we dealing with the surgeon, the urologist, the neurologist or even the dermatologist, he would expect at least a sketch of the general history, which I am certain is of quite as much value and interest to the ophthalmologist as to any other practitioner.

Ophthalmologists are not mechanicians, as are oculists or opticians, but physicians. The existence of a hyperglycemia, or a hypertension, the presence or absence of a syphilitic history or of a Wassermann reaction, I believe is quite as important to the ophthalmologist as to any other practitioner. It is not to be expected that the ophthalmologist should go so intimately into the history of previous infections, for example, and yet I can well imagine that without this the ophthalmologist may be unable to give a proper interpretation to the eye conditions present.

Internists do need and require from the ophthalmologist an opinion of this kind, and it is very helpful to us when the ophthalmologist is able to state to us the probable bearing of such a condition on the eye status and to suggest perhaps the line of treatment, if not special, which is most likely to assist in the clearing of the ocular defect.

A problem of great frequency in internal practice is that of exhaustion, either from overwork, from overemotional stress or perhaps from dissipation. Not infrequently it is the eye that appears to bear the brunt of this exhaustion, and the advice of the ophthalmologist as to such probable relationship and of the necessary steps for the conservation of the eye and the relief of its symptomatology is of much more than mere passing value to the physician. I am not aware that studies have been made by ophthalmologists of the effects on the eye of prolonged exhaustive states of a general character, but they are doubtless of great importance, at least from the standpoint of the patient and that of the man who seeks to give him relief. Closer consultation between the specialist and the practitioner is most desirable in this group of cases.

The average internist is only vaguely appreciative of the effects, permanent or transitory, of the exanthems on the eyesight. We are in need of a more authoritative statement from ophthalmologists not only for the recognition of these conditions but also as to the proper manner of their prevention and treatment when they develop. I imagine that a lack of knowledge on this subject has resulted in needless eye disease in a good many instances.

It is rather unusual that the ophthalmologist is called on to express an opinion or to give advice on supposedly normal infants and children, unless some very obvious and usually gross eye defect is manifest. This is not as it should be. Unless I am misinformed, the early institution of the proper care of the eye in infancy or early youth may result in the saving of eyesight in a good many instances. Of course, every obstetrician and general practitioner realizes the importance of eye care to prevent gonorrheal infection, but how many of us appreciate that the very early recognition of some ocular lesion may result in the prevention or cure of some defect likely to become, if unrecognized, irremediable? At least, I would say that the ophthalmologist should assert his right to state proper ocular hygiene such as is demanded by the dentist for the care of the teeth. If ophthalmologists have generally and satisfactorily considered and asserted the importance of this relation, I am unaware of it. We internists commonly discover only during the early school years the eye defects that may be of tremendous importance to the youth or adult. I doubt very much whether most pediatricians are any more competent to pass on such highly technical matters than they are qualified to correct local disease of the nose and throat. I believe that both practitioner and pediatrician should be constantly on the lookout for early eye defects, and that they should be immediately referred to the ophthalmologist.

I feel also that, from the standpoint of the internist, ophthalmologists have not sufficiently emphasized or stressed the necessity of an eye examination from a qualified physician as a part of the annual physical examination of all healthy persons. Frequently, a complete monolateral amblyopia has been discovered quite accidentally late in life. The importance of the early establishment of the eye status seems to me quite comparable in importance to the examination of the heart, especially when the integrity of sight becomes an important matter in the selection of an occupation, or when the question may arise late in life in the course of some medicolegal controversy.

Many a young man has found himself unable to establish himself in an occupation for which he may have devoted years of preparation because of some unsuspected defect of vision. Such instances are frequent in the examinations for West Point and the Naval Academy, or in the examinations of artists, chemists, certain textile workers and the like in which, for example, a correct valuation and normal color perception are essential to success.

The internist practitioner is too unappreciative of the symptoms and signs of eye exhaustion; he must rely on the ophthalmologist for his instruction, and some ophthalmologists should more carefully instruct their patients on this important subject or acquaint the family practitioner with the condition.

There still remain many subjects of great importance for the combined study of the internist and the ophthalmologist. Some of these problems are quite impossible of solution unless we combine our efforts to a far greater extent than is customary in most hospitals and clinics. The very complex problem of the classification of the migraines is such a subject. Even a slight improvement of the knowledge of either of us in regard to this tantalizing and frequent complaint would be welcomed by us all and by a host of suffering patients. Let us hope in the future for a more close association in research between the internist and the ophthalmologist.

The protean subject of seasickness is another problem, the solution of which will probably depend on associated work between internist, ophthalmologist, aurist and neurologist. Seasickness is a joke only to those who do

not suffer from it; it is a discredit to the profession that so little has been accomplished in its prevention and relief.

For the internist, one of the most appreciated and needed services which the ophthalmologist can render in the study of any case is the recognition, especially the early recognition, of arterial disease. As we all know, early arterial disease is often first apparent in the vessels of the retina and the conjunctiva. With many practitioners this is an observation noted with infrequency and considerable technical difficulty. Every report from the ophthalmologist, it seems to me, should include a statement of the condition of the retinal vessels. It is true and unquestioned that the changes in this field of distribution may poorly or not at all represent the general or specially distributed forms of arterial disease throughout the body; but the relative frequency of early changes in the ocular vessels is high and it may often serve as a warning and an indication for early correct hygiene, treatment, prevention or stabilization of a most serious condition.

I fully appreciate that it is not for me to pick out the mote from the eye of my brother practitioner, when the personal beam is apparent in the teaching methods in vogue in the undergraduate instruction of the medical student; but it does seem that I may at least be permitted to say "Et tu Brute." It appears to me that in many of the undergraduate teachings of the chair of ophthalmology the instruction is apparently designed from the assumption that the poor and overgorged medical student is to be made into an expert ophthalmologist in addition to specializing in bacteriology, chemistry, physiology, research, medicine and surgery. Can he not be taught along such lines that he will better appreciate the relationship of the eye to the general body; that while he should recognize the more serious special eye diseases, his knowledge will be chiefly along the lines of the reaction of the eye to general disease and the prevention of eye disease, and that he will fully realize that the eye is only a part of the general body? Any information he may receive until he elects to take up this specialty as a life work is merely designed to equip him to save injury to the eye and to recognize that period and condition when the practitioner should call in the consultant.

It appears to me that there is not a sufficiently close professional relationship, in most institutions at least, between the internist and the ophthalmologist. In our medical societies we do not sufficiently discuss matters with each other, and in our researches we have not sufficiently considered the needs one of the other, with the result that we have not pooled our interests more frequently. Let us hope for such a day.

At a recent medical meeting a great electrical company, which has long identified itself with research along many lines of pure science, as well as mere electricity, gave an exhibition of lighting methods which was to most of the members of the meeting a startling revelation. Several of the demonstrations exhibited problems that were of tremendous importance to the physicians present, who were closely identified with the needs of industrial advancement.

It seems to me that every physician, both in his personal and in his professional capacity, is keenly interested and concerned in the tremendous problem of light engineering. Architecture has made great strides along the lines both of art and of utility in recent years, but all too little has the work been censored and supervised by the inestimably greater problems of sanitation, longevity and the economic values of the worker.

The problem of lighting is basically one of health conservation. Many of our newer buildings, beautiful, utilitarian and economically constructed, present, none the less, a lighting system and provision that reflect the art of the architect, the skill of the artisan and the arrangement of the efficiency engineer, but very little of the skilled wisdom of that profession which should be best prepared to advise as to the protection and conservation of the health and of eyesight. I know of libraries, even medical libraries, and of innumerable schools which are provided with lighting systems which are wonderful in every respect except that of light. There are many libraries and school rooms which would be promptly rejected on this basis by the painter or sculptor, or by the weaver, engraver or skilled artisan in many industries.

It seems to me that this is a field which should lie directly within the province of the ophthalmologist. It appears to me that the Section on Ophthalmology, with the tremendous power of the parent body back of it, should take an active interest and to a considerable respect a controlling power over much of this question of lighting. A recent medical building in my knowledge, devoted to the advance of medical practice and science, presents a system of lighting devised by the architect and the librarian, and in the consideration of this subject, so far as I have been able to determine, the large sprinkling of ophthalmologists associated in this great project was not asked nor in any special way consulted as to effects on the eyesight of the system of lighting installed. Should this be so?

What are the effects on the human eye of the various forms of artificial light on which we are almost obligatorily compelled to depend, at least in the great cities? Might not definite and authoritative researches along these lines come under the control of ophthalmologists? Many studies along these lines are now being conducted, but almost exclusively by physicists and lighting engineers. Are these men, unaided, competent to answer the all-important questions as to the effects of artificial light of various kinds on the human eye and other portions of the body? Even the musician is now studying the effects of light in the production of artistic sound effects. Are we not remiss in not taking an active part in such researches? Many of our discoveries in this direction have been the result of chance or of observations incubated by the physician.

I am informed by a certain great research organization in lighting engineering, for this is rapidly becoming a specialty of engineering, that our assistance would be welcomed. I have been told by those qualified to know that there are certain forms of artificial light which engineers have found to be dangerous and destructive of human vision. Do ophthalmologists know of them, and have ophthalmologists sufficiently instructed the profession and the public at large as to these facts?

There is no question whatever but that legislation on these questions will sooner or later be directed by all of the larger communities as it already is by some. Is such legislation to be dictated by ophthalmologists, who consider it from the humanitarian standpoint and from that of human efficiency, or is it to originate from industry and its engineers?

Along this line of thought, every physician, every student and, indeed, every progressive man and civilization itself is very dependent for a proper continuance on the printed page. I realize that a tremendous economic problem is tied up with this matter, but which is the more expensive, eyesight or paper pulp? Most of us

are familiar with many medical journals and books, even standard textbooks which are exceedingly difficult to read because of the type, spacing, color of ink and paper which are utilized. Most physicians are now largely dependent for their reading time on that in which they travel from home to hospital, or from clinic to patient. If we are to read at all, it must be for many of us in the street cars, on the trains or in our own motors. I am a sufferer from his state of affairs, and I can only say that I have been in considerable part compelled to select for my professional reading journals and books which permit a reasonably easy perusal under the very faulty conditions of light that exist in these conveyances.

Cannot ophthalmologists insist, at least in their professional publications, on a style of type and a sufficiency of spacing that permit easy reading and therefore easy accessibility and utility? It seems to me that this lies well within the province of the ophthalmologist. I wonder how many ophthalmologists have been consulted as to the type, paper and spacing of their own invaluable official publication? How many as ophthalmologists and therefore as physicians much concerned in the prevention of disease, which is now the great motif of modern medicine, endorse these examples of the printer's craft?

The quiet library and the armchair are for very few of us who earn our living from the practice of our profession. We must read, if read we may, between patients or on the way from laboratory to clinic. Can we not induce our publishers to give us books and pamphlets of such size and weight that they may be carried conveniently in our consultation bag or in our overcoat pocket It seems to me that internists and physicians in general have the right to look to ophthalmologists at least for a good example, and so far as my sad experience goes, I have not observed any startlingly better type of textbook or reprint on ophthalmologic subjects than characterize the publications of the internist or the surgeon.

Perhaps my accusation is wrong. It is entirely possible that ophthalmologists have all been most actively concerned in these problems and reforms which, it appears to me, are so peculiarly their right and function. If so I must argue another wrong to the internist and to the profession at large that ophthalmologists have not told us of it.

I wish to point out what is perhaps a natural fault of the inevitably narrowing effect of specialization in that ophthalmologists infrequently take an active part in the presentation of their phases of research in general medicine bodies. I do not think that there is another single topic of medical work on which the large bulk of practitioners is less instructed than in ophthalmology. We are all of us, I think, far better informed as to the work of the chemist, the bacteriologist, even that of the physicist and engineer, than we are with the dominating problems which are the ophthalmologist's and which should be matters of at least more common knowledge to us. Perhaps it is only in the great cities that we who are occupied with the problems of general medicine know so little of what ophthalmologists are doing, and of the great influence which ophthalmologists are doubtless exerting in the pushing forward of scientific medicine.

I am afraid that some of us have been too prone to allow the mere mechanician, the oculist or the optician to dictate for us the sort of glasses that we need wear. for example, instead of referring the question as a matter of course, to the ophthalmologist. I should welcome a closer association with the ophthalmologist, and should like to hear more from him in general medical problems, in public health and in educational progress. I think that for our good ophthalmologists should mingle more with us and that they should play a more important rôle in the study of broad medical subjects.

That ophthalmologists are generous of their service is well attested by the great names in the profession who are listed as of that specialty. Is it not possible for ophthalmologists to give us more of that light on general topics which has come to them from the careful tilling of their special field?

The bacteriologist, the physicist, the chemist, the physiologist, the psychiatrist, the laryngologist, the aurist, even the entomologist, have of late given, and do constantly give, us information of tremendous value. Cannot ophthalmologists increase their service to us in like manner, so that we may act more clearly in the tremendous field of internal medicine in which so many eye problems constantly appear?

47 West Ninth Street.

ABSTRACT OF DISCUSSION

DR. E. V. L. BROWN, Chicago: Dr. Brooks has touched on a large number of interests which the internist and the ophthalmologist have in common, and has very properly warned us of danger lest we become too narrow in our specialty. He has mentioned many ways in which we may more fully do our part. He has also criticized his fellow specialists who refer cases to the ophthalmologist with no word at all about what has been found. He feels that as definite a statement as possible should accompany the patient, and with this I am sure we are all in the heartiest accord. About the reverse of the process, there will probably be less complete agreement among us; namely, the extent to which the ophthalmologist should express his opinion of the etiology of any given case. For example, in a given case, say of active acute choroiditis due, in the opinion of the ophthalmologist, to syphilis or tuberculosis, or possibly to focal infection, it is sufficient (to quote the author) "when the ophthalmologist states in his report that the eye status suggests the possibility of some occult infection as etiologically concerned." In other words, if we do more than suggest that the eye status suggests the possibility of this or that etiology, we are in that measure prejudicing the opinion of the internist. With this view of Dr. Brooks I think most of us will, on sober reflection, fully agree. For certainly many times our opinion is an embarrassment rather than a help. My own view is rather that no suggestion whatever should be made to the internist unless the condition of the eye conclusively points to some one etiologic factor and to no other.

DR. THOMAS H. CURTIN, New York: Dr. Brooks' paper is a timely one. It is a call to ophthalmologists not only to study cases a little more fully for the etiologic factors in ocular disease, as well as the physiologic disturbances, but also to discover the slightest deviation from the normal in the ocular apparatus which may facilitate proper diagnoses in some obscure pathologic conditions. The ophthalmologist has for years recognized the fact that the eye is just one small part of the great human system; also, that for the most part any eye disease is simply a local manifestation of some general systemic or focal infection. The relationship of general medicine, as well as the various specialties, has been fully recognized by the ophthalmologist, and the assistance of these various branches is requested day after day to clarify some obscure eye condition. This state of affairs is so well recognized today that in most of the larger eye clinics there is an internist in daily attendance to consult with and advise the ophthalmologist on these many perplexing problems. Our laboratories are fully equipped, and we are alive to the aids which we receive through its reports on the blood, urine, tuberculin and Wassermann tests. Can as much be said for the medical profession at large? The popular

impression of the laity and of many of the medical profession is that the ophthalmologist is a man who fits glasses; his powers to investigate or to diagnose general pathologic conditions through his special field are given little credence. His consultation work with his medical confrères is rather infinitesimal; in fact, in my own experience many patients are referred to their family physician for the treatment of conditions which were not discovered until the patient visited his ophthalmologist for eye examination. On the other hand, the ophthalmologist should have sufficient training and knowledge to observe general bodily conditions that are associated with his particular work. As Dr. Brooks suggests, courses should be given in the undergraduate schools on medical ophthalmology, particular stress being laid on the relationship between general medicine and eye diseases. Young physicians should be discouraged from taking up the specialties until after at least five years in the general practice of medicine.

DR. WILLIAM BENEDICT, Rochester, Minn.: Dr. Brooks stated in his paper that there seems to be a cleavage between ophthalmology as it is practiced and internal medicine as it is studied, and that probably this cleavage is the result of greater skill and intensification on the part of the ophthalmologist and a lack of interest on the part of the internist. I believe, however, that the internist's interest in ophthalmology is increased in proportion to the ophthalmologist's interest in internal medicine, particularly on the diagnostic side. We have found, since giving more complete reports of the ophthalmologic conditions in patients who are under general examination, that the internists have more than doubled their interest in any individual case. We have only to remember that our own work is based largely on the work of men who were not particularly ophthalmologists: that it was Clifford Allbutt who gave us the term "choked disk" as the equivalent of the German "Stauungspapilla," and that it was Gull and Sutton who laid the groundwork for the study of the retinal vessels in hypertension and in hypertensive disease which has later allowed Foster Moore to separate the retinitis of arteriosclerosis and has enabled us to differentiate the retinitis of malignant hypertension which can be diagnosed only by the aid of the ophthalmologist. We have to look forward to the closer relationship of the internist for the explanation of changes in the retina and changes in the optic nerve which result from a kidney disturbance. We must ask him to explain to us why increase in blood urea produces violent changes in the retina three or four days after the occurrence of this increase of blood urea. There are numerous instances in which the internist gets his clue as to what to look for after his conversation with the ophthalmologist, and while I agree with Dr. Brown that we may be misleading in attempting to dictate to the internist the direction toward which his investigation must go, at the same time we must not delude ourselves that we are absolutely ignorant of those physical conditions which bring about visual changes in the fundus and in the adnexa of the eye. I believe that we can be of the greatest value to the internist by suggesting that he look for this or look for that, because the eye indicates it and the indications otherwise may be absent.

DR. GEORGE DERBY, Boston: I entirely agree with what Dr. Brooks has said about the desirability of the ophthalmologist coming into very close relationship with the internist. In the East, many patients are treated in the hospitals, and the conditions are not, as far as cooperation goes, entirely good. Either we have the eye department of a general hospital, which is the tail of the dog, one might say, being one of the smaller departments and getting the last choice on everything, or we have our large eye hospitals separated from the general hospitals, and in those it seems to me it is extremely difficult to get into close consultation relations with the physicians, neurologists or surgeons whom we need to consult. The Massachusetts Eye and Ear Infirmary has a building in the corner of the grounds of the Massachusetts General Hospital, and yet the importance of close consultation relationship with the other branches of medicine has seemed so great to us that we are now building a new structure in which our outpatient department will be established, and which will be under the same roof as the outpatient department of the Massachusetts General Hospital. That will mean that we will simply have to send our patients upstairs or along the same floor to the other departments of the hospital, and that we, too, can go up to those other departments to discuss these cases with the men with whom we wish to talk them over. Already we have instituted joint clinics with our neurologic department with which we have very close relationship. Once a week we meet with the neurologists, at which meeting various cases of interest are brought up. We hope to establish such a relationship with the medical department, and perhaps with some of the other departments in the future.

THE ETIOLOGY OF MEASLES*

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AND
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It is generally accepted as a proved fact that the contagium of measles is present in the blood stream during the late preeruptive and early eruptive stages of the disease. This was first conclusively demonstrated by Hektoen,[1] who produced clinical measles in two adults by injecting them with ascites broth which had been inoculated with blood from a measles patient. Experiments with monkeys[2] have confirmed the correctness of this view.

The epidemiologic evidence indicates with great probability that the contagium is present in the throat and nasal secretions just before the fastigium and at the height of the eruption, disappearing or becoming noninfectious with the fading of the rash. While both of these facts have been apparent for some time, and attempts to cultivate the specific organism from the blood and throat secretions had been made, little had been accomplished until Tunnicliff,[3] in 1917, isolated a green, anaerobic, gram-positive diplococcus from the blood of measles patients with great regularity, using semisolid culture mediums. Similar cocci were found in throat smears from early cases, the cocci appearing generally within large epithelial cells and polymorphous leukocytes. Since that time cocci which differ in some respects from the Tunnicliff organism have been described by various workers. Caronia[4] reports cultivating a gram-negative anaerobic coccus from the blood, bone marrow, spinal fluid and nasopharyngeal secretions of patients with early eruptive measles, and he found immune bodies in the serums of convalescent patients specific for this organism. Ferry and Fisher[5] isolated from the blood of patients with measles a gram-positive, aerobic, green-producing streptococcus which produces a soluble toxin neutralized by the serums from convalescent measles patients. A facultative aerobic, gram-positive, green-producing diplococcus

* Read before the Section on Pathology and Physiology at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 19, 1927.

From the Department of Hygiene and Bacteriology, University of Chicago, aided by a grant from the Douglas Smith Research Foundation with the cooperation of the Chicago Department of Health, Herman N. Bundesen, Commissioner.

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has recently been cultivated by Duval and Hibbard [6] from six cases. This organism is a filter passer when in blood serums, but subcultures are visible and nonfilter passsers.

We have attempted to throw additional light on the causal organism of measles. It seemed logical to center our attention chiefly on the throat secretions and the blood in cases of measles during the height of the eruption. Cultures have been made from the tonsillar area from ninety-five cases of measles in the early eruptive stage on sheep blood agar. In ninety-three, or 98 per cent, of cases a small, green-producing, gram-positive, short chained streptococcus has been present. In many of the cases this was in nearly pure culture, and in the greater number it was the predominating organism. It grew well aerobically in twenty-four hours, the colonies appearing as minute pinpoints with a green surrounding zone several times their size. This green-producing organism persists in the throat after the patient ceases to be contagious epidemiologically, but the type of colony changes quite definitely as the temperature becomes normal to one growing with much more vigor. We are not yet prepared to say what this means. Normal throats may give as high as 50 per cent positive cultures for *Streptococcus viridans,* the colonies of which correspond more nearly to those from late measles cases. Smear preparations on slides from the throats of these ninety-five patients have all shown gram-positive diplococci to be the predominating organism. In the earliest cases, before the fastigium is reached, we have found the diplococci undergoing active phagocytosis within the epithelial cells and leukocytes. Attention has been called to this picture by Tunnicliff.[7]

The organism we have isolated is variable in size. Most of the forms are retained by Berkefeld N filters, although we have reason to believe that some are filter passers in secretions from early cases. The throats from febrile patients were sprayed with sterile salt solution with an antrum irrigator, and the washings were passed through a filter. The filtrate was sterile to tests on ordinary culture mediums. On injection of doses of 10 cc. intratracheally and intravenously into rabbits, febrile responses of from 0.8 to 3 degrees were noted in eight animals on the fourth to ninth days, with a distinct coincident rash in one case. From one of these rabbits, a cardiac puncture at the febrile period yielded a pure culture of a green diplococcus. In interpreting temperatures, it was found necessary to treat each rabbit as an individual and to establish his normal temperature before inoculation, basing a febrile response on this. It is not practical, as Scott and Simon [8] pointed out, to establish an average temperature for rabbits as a basis for comparison. We have not found as constant responses to inoculation with measles virus in rabbits as these investigators did. Control animals inoculated with sterile broth and filtrates from normal throats did not show a febrile response.

Cultures from the conjunctival secretions were studied in twenty-one cases. Sterile swabs were touched to the everted lower lid. These were inoculated on the surface of sheep blood agar plates and incubated aerobically. In eleven cases a green-producing diplococcus was found, while ten cases proved negative. In some cases large numbers of organisms were present, but generally the numbers were few. The green organisms were apparently identical with those found in the tonsillar region. In only one case were they found later than the second day of the rash.

Blood cultures have been made in fifteen cases within thirty-six hours of the appearance of the rash. Various fluid mediums have been tried. Hiss serum brain and Hibler's mediums have been found the most satisfactory. We have isolated the green diplococci in five instances: one on Hibler's mediums; two on Hiss serum brain; one on both Hiss serum brain and Hibler's mediums, and one anaerobically on Hiss serum brain. About 5 cc. of the patient's blood was added at the bedside to about 25 cc. of the mediums and incubated for from two to fifteen days at 37 C. The nature of these mediums is such that there is doubtless reduced oxygen tension in the lower portion of the deep tube. The organism is apparently a facultative anaerobe. When fished to blood agar plates, it grows quite vigorously with a larger colony than is generally found from the throat cultures.

Rabbits have been injected successfully with pure cultures of seven strains of these green organisms. A forty-eight hour broth culture has generally been used, 10 cc. amounts being injected intravenously. We have considered an elevation of temperature of 0.8 degree or more and a definite erythema or macular rash on the depilated abdomen as evidence of a reaction. On this basis we have produced measles in rabbits with five throat and eye strains and with two of our blood strains. The depilation has always been done a week or more in advance of injection. The febrile response has fallen between the seventh and the thirteenth days after inoculation, and the rash from the fourth to the fourteenth days. Koplik spots in rabbits have proved of little aid as evidence of infection in our hands, and a leukopenia, while often present, has not seemed of great value. The green diplococci was isolated from the heart blood of one rabbit on the ninth and fourteenth days following injection, at which times there were definite macules and a febrile response. One throat strain was passed through a series of four rabbits, inoculation being done from the heart blood of one rabbit showing a febrile response to the ear vein of another. Each of the rabbits showed a definite rash on the eighth to tenth day following injection. It is not uncommon to get two febrile periods in the rabbit around from the seventh to the ninth days and again about the fourteenth day. Emaciation in infected rabbits is often noted as well as mild diarrhea. Not all rabbits are equally susceptible to the same injection. We have noted definite differences in sensitiveness on applying toxic filtrate as a skin test.

Fermentation tests were made in broth to which unheated filtered carbohydrates were added, lactose, salicin and mannite being used. Forty-eight strains were used, all of which, with the exception of the pneumococci, were bile insoluble. These strains were from the following sources: measles blood, four; measles throat, twenty-three; measles eye, six; pneumococci, three; normal throat, nine; asthmatic bronchitis, one; Ferry measles, one, and Tunnicliff measles, one. The results as given in the accompanying tabulation indicate that salicin is of most differential value in that thirty-four measles strains out of thirty-five

6. Duval, C. W., and Hibbard, R. J.: Further Studies on the Etiology of Measles, Proc. Soc. Exper. Biol. & Med. **24**: 519 (March) 1927.
7. Tunnicliff, Ruth: Observations on Throat Smears in Measles, Rubella and Scarlet Fever, J. A. M. A. **71**: 104 (July 13) 1918.
8. Scott, J. M., and Simon, C. E.: The Thermic and Leukocytic Response of the Rabbit to Inoculation with the Virus of Measles, Am. J. Hyg. **4**: 559 (Sept.) 1924.

fermented salicin, whereas only two of the ten normal *Streptococcus viridans* ferment this carbohydrate.

Agglutination tests with five convalescent measles serums were run with rather indifferent results. Some strains agglutinate well in dilutions as high as 1:128, while others were not agglutinated. Our meager experience would indicate great differences in the potency of convalescent serums.

Results of Fermentation Tests

		Lactose		Salicin		Mannite	
Number of Strains	Source	Positive	Negative	Positive	Negative	Positive	Negative
4	Blood	4	0	4	0	4	0
23	Throat	23	0	22	1	2	21
6	Eye	5	1	6	0	2	4
3	Pneumococci	3	0	3	0	0	3
9	Normal throat	7	2	2	7	0	9
1	Asthmatic bronchitis	1	0	1	0	0	1
1	Ferry strain	1	0	1	0	0	1
1	Tunnicliff strain	1	0	1	0	0	1

CONCLUSIONS

1. Of the throat cultures from early measles cases, 98 per cent showed a green-producing aerobic gram-positive diplococcus usually as the predominating organism. There is reason to believe that there are forms small enough to be filter passers.

2. The type of colony found in the throat changes during convalescence.

3. Smears from the throat of early measles patients show the diplococci predominating.

4. The filtrate from throat washings causes a febrile response and a definite rash when injected into rabbits intratracheally or intravenously. Some rabbits are apparently not susceptible to measles.

5. About 50 per cent of measles patients show green diplococci in the conjunctival secretions during the first forty-eight hours of the rash.

6. Blood cultures were positive in five out of fifteen cases studied, showing a green diplococcus similar to that found in the throat and conjunctival secretions. The organisms were facultative anaerobes.

7. Seven strains have produced febrile responses and cutaneous rashes in rabbits when injected intravenously, the febrile response falling between the seventh and thirteenth days after inoculation. The organism was recovered from the heart blood in one animal. Passage through four successive rabbits has been made.

8. Salicin appears to be of value in differentiating the diplococci of measles from *Streptococcus viridans*.

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ABSTRACT OF DISCUSSION

DR. WILLIAM H. PARK, New York: Those who read the *Journal of the American Public Health Association* know that the May number contained an article by Dr. Williams, Miss Wilson and myself on this subject. As far as the observations of Dr. Tunnicliff and Dr. Ferry are concerned, we are in general agreement. We differ, however, in our interpretation of those observations. We find it difficult to believe that Dr. Tunnicliff's streptococcus, after infecting the mucous membranes of the upper respiratory tract, should lie dormant in the throat for seven or eight days without ability to disseminate infection and then with the development of the first signs of coryza or of fever should become very infectious. Another difficulty is that the organisms whether isolated from the blood or from the throat have very distinctive differences among themselves. That some immunity to the toxin is developed by an attack of measles may be due to the fact that these streptococci are present in practically all cases of measles, so that the development of a moderate amount of immunity to the toxins of these organisms does not necessarily mean that the streptococci are the cause of the disease. We have not been able to produce in monkeys measles by the filtrate of the culture of this green streptococcus alone, while Degkwitz and others, including ourselves, have produced it with the filtrate of the symbiotic culture of the blood virus and the streptococci. I am therefore inclined to believe that the measles virus is a real filtrable virus and not any organism of the size of the green streptococcus. In these studies Dr. Tunnicliff has been most helpful to us; she has sent us not only her cultures but her toxins as well for skin tests. We have not been able to prove to our satisfaction that there is any distinctive difference in the skin reaction between those who have had measles and those who have not had measles. Dr. Ferry has also sent us cultures and toxin. Although we are still very much interested in these streptococci, we are inclined to believe that they are only accompanying organisms. We believe that the evidence pointing toward certain strains of hemolytic streptococci as the cause is very much stronger in scarlet fever than in measles.

DR. W. T. HARRISON, Washington, D. C.: From November, 1926, until last month, I was associated with Dr. Rudolph Degkwitz. He has already published reports on his work done in Germany. The researches were begun at the Pfaundler Clinic in Munich. He came to America to prove his contention that measles is caused by a filtrable virus. In November, a culture was obtained from the nose and throat of an adult with measles in the full eruptive stage. This material was inoculated in human plasma, diluted 1:20 with buffered salt solution. The culture was incubated overnight, passed through Berkefeld filters and inoculated into human blood plasma 1:7, and rendered semisolid by the addition of calcium chloride. Cultures were transferred every six days, sheep plasma, increased by 25 per cent at each transfer, being added until at the fourth transfer sheep plasma alone was used. The green-producing streptococcus of Tunnicliff was used in alternate transfers as a symbiont. At the third transfer, the culture was passed through a Berkefeld N filter and inoculated into two monkeys which had been previously bled for normal monkey serum. One monkey which received the culture medium as a control remained free from symptoms. In from ten to twelve days, at the height of the febrile reaction in the two inoculated monkeys, blood was transferred to two others; and this process was repeated through the fourth generation in monkeys. The monkeys were bled from one to two weeks after defervescence to secure convalescent monkey serum. The normal serum from monkeys 1 and 2, with convalescent serum from the same animals, was used in protection experiments on exposed susceptible children, the serum being given on the day following exposure. Normal monkey serum was without effect, but convalescent monkey serum protected in every instance. This would strongly suggest that the disease produced in these monkeys was measles, and that passive transfer of immunity to susceptible children had been accomplished. As Dr. Park stated, the incubation period in measles seems to be rather long for a disease due to an organism of the streptococcus group.

DR. FREDERICK EBERSON, San Francisco: I should like to ask Dr. Cary just how large a dose was used for injection into rabbits, especially in reference to the symptomatology of the animals.

DR. WILLIAM E. CARY, Chicago: In regard to the toxic filtrate from these green organisms, we have not done an extensive amount of work on it. One of the men who is working in our laboratory at the University of Chicago has been using the Ferry organism and filtrate. He has one or two very interesting cases in which 10 cc. of filtrate from this organism was injected into rabbits with a fair response and a fairly typical rash. He has isolated a green organism from the heart blood of the rabbit showing the response. This is rather suggestive that our toxic filtrate may possibly contain filtrable forms of this green organism that subsequently become large enough to be seen. We have also done

a limited number of skin tests, using the toxins produced from our strains in patients and trying to determine whether or not they were of significance in determining which were susceptible. We cannot say at the present time that we have had any very consistently satisfactory results. We grant that in many of these cases the histories of measles are unreliable as a basis for statistical study. The work that Dr. Harris reports is very interesting to me, and we certainly are not entirely convinced ourselves that there may not be other factors than the green organisms that can be demonstrated as the cause of measles. We realize that the questions that have been raised by Dr. Park and Dr. Harris are not satisfactorily answered in many respects. In regard to Dr. Eberson's question, we have used amounts of from 5 to 10 cc. of the suspension of the organism, in some cases grown on solid mediums and washed off; in other cases grown in broth for two days before injection. The broth cultures may have some toxic material, of course. We have not found that the toxin produced with our organism is a potent toxin by any means, dilutions of one to ten, or the full concentration of the material, being necessary for skin test either in human beings or in rabbits.

MEDICAL TREATMENT IN DISEASES OF THE LIVER AND BILE PASSAGES *

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The recent accumulation of information with regard to the physiology of the liver has served to provide the medical profession with new clinical and laboratory criteria of hepatic disorders. The therapeutics of hepatic disease has lagged somewhat behind the general advance of knowledge in this field, although a number of notable contributions have been made to both medical and surgical management.

GENERAL PREVENTIVE MEASURES

The liver, like the kidney, is susceptible to injury from infections and toxic substances; among the latter may be mentioned a group of chemicals, such as phosphorus, chloroform, phenylhydrazine, trinitrotoluene, tetrachlorethane, trinitrophenol and carbon tetrachloride, all of which have been shown to produce hepatic lesions in the experimental animal or in man.

Alcohol has always loomed large as an etiologic agent in portal cirrhosis and, while no conclusive experimental proof of its relation to hepatic disease has ever been offered, clinical experience has established its importance practically beyond question. A relation between chronic copper poisoning and the hepatic lesions in hemochromatosis has been suggested by the experimental work of Mallory and others.[1] Arsphenamine jaundice is the best known manifestation of the effect of arsenic on the liver; the development of hepatic injury without icterus, following arsenic poisoning, is not so well recognized, although cases of ascitic cirrhosis in which arsenic is a probable factor are not infrequently observed. Such cases emphasize the importance of prophylaxis against poisons which may affect the liver specifically.

The reaction of the hepatic parenchyma to infectious processes, going on to permanent injury to the liver, is of great practical significance, especially from the standpoint of prophylaxis. Foci of infection in the appendix and biliary tract are particularly significant in this connection, as shown by the work of Graham,[2] MacCarty and Jackson,[3] and others. It is recognized that typhoid, as well as many other infectious diseases, may cause localized necrosis in the liver. The same is true of exophthalmic goiter, the toxemias of pregnancy, and toxemias associated with chronic suppuration. The repair and absorption of such areas may conceivably lead to occlusion of the vascular or biliary tracts and thus may favor the subsequent development of cirrhosis. The prevention of the infectious diseases and the prompt recognition and treatment of these toxemias and infections thus assume a place of first importance in the prophylaxis of hepatic disease.

GENERAL DIETARY AND HYGIENIC MEASURES

There is a great deal of experimental evidence to show that general hygienic and dietary measures may be of considerable importance in the treatment of diseases of the liver and biliary tract. The fact that a high intake of carbohydrate increases the resistance to experimental phosphorus poisoning, as shown by Opie and Alford,[4] points to the necessity for an adequate carbohydrate intake in hepatic disorders. In Mann's [5] dehepatized dogs there is a striking and progressive fall of blood sugar, and convulsions occur when a critical level of hypoglycemia is reached. The period of survival of these animals may be increased by the use of dextrose solutions intravenously.

Mann's experiments have also shown conclusively the relationship of the liver to protein metabolism. Following hepatectomy, a fall in blood urea and nonprotein nitrogen occurs; uric acid and amino-acids accumulate in the blood. These abnormalities of protein metabolism, as well as those observed in animals after Eck fistula, have not been encountered clinically, but nevertheless there is ample physiologic justification for curtailing the ingestion of protein in the presence of hepatic disease. Since the normal emulsification of fat by the bile acids does not take place when bile is absent from the intestine, fats are not absorbed and are often poorly tolerated by patients suffering from obstructive jaundice.

The form of diet best suited to patients with cholecystic disease is fairly well established by clinical experience. Fatty foods are restricted, particularly those rich in cholesterol; the total intake of food is reduced in the overweight, and a bland diet is given if there are reflex gastric disturbances. Hydrochloric acid is used for the anacidity or subacidity, and the associated gastro-intestinal symptoms which so frequently accompany disease of the biliary tract. None of these measures is of sufficient curative importance, however, to justify the postponement of necessary operations on the gallbladder.

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* Read before the Section on Pharmacology and Therapeutics at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 19, 1927.

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2. Graham, E. A.: Hepatitis: A Constant Accompaniment of Cholecystitis, Surg. Gynec. Obst. **26**: 521-537 (May) 1918.

3. MacCarty, W. C., and Jackson, Arnold: The Relation of Hepatitis to Cholecystitis, Minnesota Med. **4**: 377-382 (June) 1921.

4. Opie, E. L., and Alford, L. B.: The Influence of Diet upon Necrosis Caused by Hepatic and Renal Poisons: Part I. Diet and the Hepatic Lesions of Chloroform, Phosphorus or Alcohol, J. Exper. Med. **21**: 1-20, 1915.

5. Bollman, J. L.; Mann, F. C., and Magath, T. B.: Studies on the Physiology of the Liver: VIII. Effect of Total Removal of the Liver on the Formation of Urea, Am. J. Physiol. **69**: 371-392 (July) 1924. Mann, F. C., and Magath, T. B.: Studies on the Physiology of the Liver: II. The Effect of the Removal of the Liver on the Blood Sugar Level, Arch. Int. Med. **30**: 73-84 (July) 1922.

NONSURGICAL TREATMENT OF DISEASES OF THE BILE PASSAGES

Among the medical measures that have found favor in the treatment of disease of the bile passages, duodenal drainage, and the administration of cholagogues and biliary antiseptics, may be mentioned.

Duodenal Drainage.—Nonsurgical biliary drainage has been widely used, but its value in diagnosis and treatment has not as yet been definitely determined. It does furnish information of diagnostic value when the patency of the common bile duct is in question, and Jones [6] has found a rather characteristic microscopic picture in the duodenal contents in cases of cholelithiasis. It has been advanced as a reliable therapeutic measure in catarrhal jaundice, but in view of the usually self-limited nature of the disease, such claims are difficult to substantiate. That it is of somewhat greater importance in jaundice secondary to arsphenamine treatment in syphilis is shown by the work of Wilhelm.[7] We have not found it of particular value in the treatment of infectious hepatitis or cholangeitis.

The Use of Cholagogues.—In former times, a large number of drugs were supposed to increase the amount of bile secreted by the liver. The idea of a drug having an action on the bile is as old as Hippocrates, but the word "cholagogue" does not appear to have been used prior to the time of Galen. Schiff [8] (1870) in experiments on dogs noted a cholagogue action of bile, and postulated its enterohepatic circulation. Pfaff and Balch [9] (1897) reported in detail a prolonged study of the effect of various drugs on the excretion of bile in a case of biliary fistula. They found that bile and bile salts produced an increased flow of bile with a higher content of solids, while other substances produced little or not any change. More recently, Whipple [10] and his co-workers investigated the effect of a large number of drugs on dogs with biliary fistula and have not found any evidence of cholagogue activity by any except bile salts. These, as the recent work of Greene [11] has shown, are excreted primarily by an increase in the volume rather than by changes in the concentration of the bile. The therapeutic status of cholagogues is unsettled, and further clinical work on the subject is required. Granted cholagogues which could be readily and safely used, it is not likely that much could be accomplished in the treatment of diseases of the biliary tract through such agencies. The greater need is for some remedy which would empty the gallbladder itself; magnesium sulphate, egg yolk, oleic acid and other substances have been reported to possess this property, but experimental proof of their efficacy is not complete, and their clinical application has been somewhat disappointing.

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9. Pfaff, Franz; and Balch, A. W.: An Experimental Investigation of Some of the Conditions Influencing the Secretion and Composition of Human Bile, J. Exper. Med. **2:** 49-105, 1897.

10. Whipple, G. H.: The Origin and Significance of the Constituents of the Bile, Physiol. Rev. **2:** 440-459 (July) 1922. Foster, M. G.; Hooper, C. W., and Whipple, G. H.: The Metabolism of Bile Acids, III. Administration by Stomach of Bile, Bile Acids, Taurine, and Cholic Acid to Show the Influence upon Bile Acid Elimination, J. Biol. Chem. **38:** 379-392 (June) 1919.

11. Greene, C. H.: Studies on the Metabolism of the Bile Acids: IV. The Composition of the Bile After the Intravenous Injection of Certain of Its Constituents, J. Biol. Chem., to be published. Rosenthal, S. M., and White, E. C.: Studies in Hepatic Function: VI. A. The Pharmacological Behavior of Certain Phthalein Dyes. B. The Value of Selected Phthalein Compounds in the Estimation of Hepatic Function, J. Pharmacol. & Exper. Therap. **24:** 265-288 (Nov.) 1924.

Biliary Antiseptics.—The use of biliary antiseptics has received an impetus from the discovery that mercurochrome-220 soluble, given either intravenously or by mouth, is eliminated in the bile.[12] Methenamine, which has been used in this connection for years, is probably inactive so far as sterilization of the bile is concerned. Our own experiments show that mercurochrome is also probably inert as a biliary antiseptic.[13] While it is bactericidal when mixed with bile in vitro, it loses this power to a great extent after passage through the liver. Its colorimetric determination in bile has shown that it is changed in some unknown manner by the liver, and is thus rendered inactive. Meyer, Sommer and Eddie [14] have found that mercurochrome did not sterilize experimentally produced typhoid carriers in rabbits, although the drug was excreted in sufficient concentration to accomplish this theoretically, had it remained in its original form. The fact that infection is in the walls of the bile passages, as well as in the bile itself, as shown by the bacteriologic studies of Judd, Mentzer and Parkhill,[15] may serve to explain the ineffectiveness of this drug. The medical treatment of diseases of the biliary passages by diet, duodenal drainage, cholagogues and biliary antiseptics is unsatisfactory at its best, and in many instances may do actual harm by postponing the adoption of radical surgical measures.

CONSTITUTIONAL TREATMENT OF SYPHILITIC HEPATIC DISEASE

The practice of advising antisyphilitic treatment in obscure cases of hepatic disease is an inheritance from the days before the Wassermann test. The routine use of the Kolmer technic has largely obviated the necessity of such a practice; the experience of the Mayo Clinic has shown that in at least 90 per cent of the proved cases of syphilitic hepatitis serologic data are positive. McCrae and Caven's [16] figures are not quite so high (about 80 per cent).

The treatment of hepatic syphilis as suggested by O'Leary [17] has for its fundamental principle the cautious administration of mercury and iodides in order that replacement fibrosis will take place slowly and sufficient time be allowed for the collateral circulation to develop. He has stated emphatically that the administration of any of the arsenic preparations in the early treatment of syphilitic disease of the liver is frequently attended with more ill effects than good; an intractable cirrhosis may rapidly develop in a liver affected by diffuse syphilitic hepatitis, or in a gummatous liver following the use of arsphenamine. O'Leary recommends starting the treatment with mercury and potassium iodide by mouth, and continuing it until the possibility of a Herxheimer reaction is eliminated and the patient begins to show definite clinical signs of improvement. This may require several months. At the end of this time, the administration of mercury by inunction or by injection may be started. This conservative oral method of administration permits one to observe the

12. Hill, J. H., and Scott, W. W.: Mercurochrome-220 Soluble as a Biliary Antiseptic, Arch. Int. Med. **35:** 503-515 (April) 1925.

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14. Meyer, K. F.; Sommer, H., and Eddie, B.: Unsuccessful Experiments with Mercurochrome as a Biliary Antiseptic, J. Infect. Dis. **38:** 469-485 (June) 1926.

15. Judd, E. S.; Mentzer, S. H., and Parkhill, Edith: A Bacteriologic Study of Gallbladders Removed at Operation, Am. J. M. Sc. **173:** 16-23 (Jan.) 1927.

16. McCrae, Thomas; and Caven, W. R.: Tertiary Syphilis of Liver, Am. J. M. Sc. **172:** 781-796 (Dec.) 1926.

17. O'Leary, P. A.: Personal communication to the authors.

effect of mercury on the kidney, the importance of which is manifest since a moderate or mild degree of renal injury is usually associated with syphilitic disease of the liver. Occasionally, if other manifestations of syphilis require more intensive treatment, arsphenamine may be used, but only after cautious preliminary treatment with iodides and mercury. In the small group of patients (from 10 to 20 per cent) in which the diagnosis of hepatic syphilis is doubtful and serologic data are negative, the therapeutic test must often be relied on. This is best carried out along the lines just described, the use of arsphenamine being avoided except in rare instances.

The treatment of various forms of parasitic hepatitis is a most serious problem in tropical countries, where infestation of the liver with certain parasites is not an uncommon occurrence. In clinical practice in the temperate zones, the only form of parasitic hepatitis encountered with any frequency is that associated with amebiasis. Not infrequently types of hepatitis are encountered in which a parasitic agent cannot be demonstrated. These indeterminate types of hepatitis may be of infectious origin, but in the main they are difficult to classify and even more difficult to influence by treatment. We have observed such cases in which fever and malaise associated with obscure forms of hepatitis have been relieved by emetine.

SYMPTOMATIC TREATMENT

Many cases of hepatic disease cannot be influenced by any known form of antisyphilitic treatment; in such cases our efforts are necessarily confined to the relief of symptoms. Such distressing complications as pruritus, hepatic congestion and ascites are worthy of particular attention.

Pruritus.—Pruritus is an outstanding feature of many cases of obstructive and infectious jaundice, and is frequently very troublesome to the patient, interfering as it does with rest and sleep. It is often encountered at its worst in cases of biliary cirrhosis in which the degree of jaundice is slight and injury to the liver (as shown by dye retention tests) moderate or severe. The fact that pruritus is not observed in cases of hemolytic jaundice favors the theory that this symptom is related to retention of bile acids in the organism. However, the work of Rowntree, Greene and Aldrich [18] indicates that, while there may be some association between bile acids and pruritus, a direct causal relationship is not evident.

The previously accepted form of treatment has consisted of sweating and local applications of antipruritic substances. Such treatment is not particularly successful except when itching is mild and of short duration. General diathermy has given good results in several cases of obstructive jaundice, relief being immediate and practically complete. The benefit derived from it is usually of short duration and, since diathermy is not generally available, the treatment is not suitable for continued use outside of institutions.

Eppinger [19] has recently reported the value of calomel in the treatment of pruritus in hepatic disease. We have found it to be valuable as an antipruritic, and its use in this connection has been reported by McVicar and Weir.[20] The drug is given in daily quantities of from 1 to 2 grains (0.06 to 0.13 Gm.), in divided doses of from ¼ to ½ grain (16 to 32 mg.) at half-hour intervals; such a course may be instituted two or three days of each week. The dose may be varied to suit the individual case, just enough being taken to control the pruritus.

Hepatic Congestion Associated with Cardiac Decompensation.—Hepatic congestion is a common early observation in cases of broken cardiac compensation. With high grades of chronic passive congestion existing over long periods, a form of hepatic fibrosis associated with ascites may occur. The treatment is obviously that of the underlying cardiac decompensation; in many instances, however, the condition may prove resistant to digitalis and caffeine diuretics. In such advanced cases with ascites, mercury may be peculiarly effective. In combination with squills and digitalis (Addison's or Baillie's pill) it has been used for nearly a century, and Jendrássik,[21] in 1891, reported favorably from Wagner's clinic on the use of calomel as a diuretic in this condition. The administration of concentrated hydragogue cathartics, after the method of Hay, is a useful adjuvant.

Ascites.—Attempts to relieve ascites by various medical measures have attracted attention from the earliest times. The use of diuretics, diaphoretics and purges is very ancient; Araetacus mentioned the disappearance of ascites after free discharge of urine. Boerhaave also advised the use of diuretics and specifically mentioned the value of mercury as well as the advantages of a dry diet. Morgagni anticipated the present use of urea as a diuretic by employing sheep's urine in the treatment of ascites. Murchison,[22] in 1885, mentioned the use of cathartics, calomel, Addison's pill, and also ammonium chloride; he referred to ammonium chloride as a diuretic and diaphoretic.

Abdominal paracentesis was mentioned by Hippocrates, and referred to subsequently by Galen. Both Celsus and Paulus Aegineta gave careful descriptions of the technic of this procedure. It has always been the treatment of last resort in ascites; the ancients reported the occurrence of sudden death after the removal of fluid, and Asclepiades and Soranus were said to have disapproved of the practice. Hale White,[23] in 1892, made the significant statement that it was rarely necessary to resort to paracentesis more than once in cases of true alcoholic cirrhosis, the patient dying before the fluid reaccumulated. While White's statement does not hold strictly true today, paracentesis is looked on with some disfavor by the patient and physician alike. The medical control of ascites is considered highly desirable, however, and is now possible by the modern combination of the old remedies, mercury and ammonium salts. "Medical tapping" by these means is now widely and successfully practiced, the organic mercurial diuretic merbaphen, introduced by Saxl and Heilig,[24] being largely responsible for its present vogue.

18. Rowntree, L. G.; Greene, C. H., and Aldrich, Martha: Quantitative Pettenkofer Values in Blood with Special Reference to Hepatic Disease: A Preliminary Report, J. Clin. Investigation, to be published.

19. Eppinger, Hans: Allgemeine und spezielle Pathologie des Ikterus, in Kraus, Friedrich; and Brugsch, Theodor: Spezielle Pathologie und Therapie innerer Krankheiten, 1923, vi, ii, 97-340. Vienna Letter, J. A. M. A. **85**: 1573 (Nov. 14) 1925.

20. McVicar, C. S., and Weir, J. F.: Dissociated Jaundice, M. Clin. N. Amer. **10**: 499-508 (Nov.) 1926.

21. Jendrássik, Ernst: Das Calomel als Diureticum, Deutsches Arch. f. klin. Med. **38**: 499-524, 1886; Weitere Untersuchungen über die Quecksilberdiurese, ibid. **47**: 226-288, 1891.

22. Murchison, Charles: Clinical Lectures on Diseases of the Liver, Jaundice and Abdominal Dropsy, London, Longmans, Green & Co., 1885.

23. White, W. H.: The Cause and Prognosis of Ascites Due to Alcoholic Cirrhosis of the Liver, to Perihepatitis, and to Chronic Peritonitis, Guy's Hosp. Rep. **49**: 1-42, 1892.

24. Saxl, Paul; and Heilig, Robert: Ueber die diuretische Wirkung von Novasurol- und anderen Quecksilberinjektionen, Wien. klin. Wchnschr. **33**: 943-944 (Oct. 21) 1920.

This method of treatment has been reported on by Rowntree, Keith and Barrier,[25] and will not be described. The best results have been obtained by the combined use of merbaphen, either intramuscularly or intravenously, and ammonium chloride by mouth, together with a special diet devised by Keith and Smith.[26] This treatment may be expected to produce effective diuresis in more than 75 per cent of cases with ascites due to hepatic disease, and also serves to keep ascites under control in most cases.

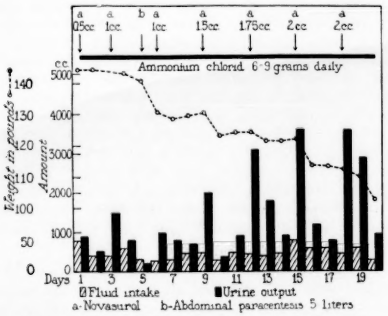


Chart 1.—Delayed diuretic effect in cirrhosis with ascites.

Further experience with the method has brought out some points of therapeutic importance. The first relates to the diet, which may be a crucial factor in resistant cases. The original diet contained 800 cc. of water, and inorganic ions as follows: sodium, 0.49 Gm.; potassium, 1.76 Gm.; calcium, 0.23 Gm.; magnesium, 0.20 Gm., and chlorine, 0.74 Gm.; 800 cc. of water was allowed in addition. While this rigid restriction may not always be necessary, the importance of a diet low in fluids and basic ions, particularly sodium, cannot be overemphasized.

Not infrequently at the beginning of treatment there is little or no diuretic effect following the administration of ammonium chloride and merbaphen. If toxic effects are not noted and the patient's general condition is satisfactory, it is advisable to persist in the treatment; often excellent diuresis and complete disappearance of ascites will follow. The case illustrated in chart 1 was unusually resistant to treatment, and the abdomen had to be tapped shortly after the patient's admission to the hospital; eventually there was a satisfactory response to merbaphen. Treatment thereafter was entirely successful, and the patient has remained in good health.

In resistant cases other diuretic drugs should be tried in addition to ammonium chloride or as substitutes for it. Jacobs and Keith[27] have shown that ammonium nitrate is effective; it has also the advantage of being much better borne by the stomach. Blum and others[28] have found calcium chloride an effective diuretic; Müller[29] has obtained good results with potassium chloride, and Rowntree[30] has used large doses of hydrochloric acid in one case with good effect. Kempmann and Menschel[31] have shown that the effect of a theophylline preparation, a caffeine derivative, may be enhanced by the conjoint administration of acid-producing diuretics. We have used such a theophylline preparation in conjunction with the ammonium salt-merbaphen treatment in a few cases of ascitic cirrhosis, with gratifying results. Chart 2 represents the water balance in such a case; following the addition of the theophylline preparation to the usual treatment, the increase in the output of urine was striking.

It is now well known that ascites may be kept under control for considerable periods by these methods. In a number of our cases a remarkably complete and permanent effect has been noted, moderate restriction of salt and water in the diet being sufficient to prevent the accumulation of fluid. This has amounted virtually to symptomatic cure in several instances; while these "cures" probably depend on the development of collateral circulation, it is interesting to note that in many instances the visible collateral channels diminish and often disappear altogether as the ascites subsides. In other cases which we have followed over long periods, a gradual diminution in the response to diuretics has been noted. This is of grave prognostic significance, and often indicates the approach of terminal hepatic toxemia. These cases remind one that the natural course of portal cirrhosis must not be forgotten in the enthusiasm for new forms of symptomatic treatment.

Since more patients now survive long enough to establish extensive collateral circulation through the gastric veins, death due to hemorrhage from esophageal varices is becoming increasingly common. A method for controlling hemorrhage from this source has not been devised; a surgical approach to the problems seems most likely to produce satisfactory results. Short-circuiting operations similar to an Eck fistula may eventually furnish the solution.

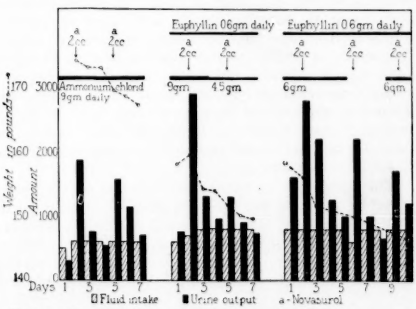


Chart 2.—The effect of the addition of euphyllin to the ammonium salt-merbaphen treatment.

TOXIC DRUG EFFECTS AND HEPATIC TOXEMIA

In the medical treatment of ascites, associated with hepatic cirrhosis, certain untoward reactions have been ascribed to the drugs just mentioned. The acid-producing diuretics are occasionally responsible for nausea and vomiting, an effect which may be avoided

25. Rowntree, L. G.; Keith, N. M., and Barrier, C. W.: Novasurol in the Treatment of Ascites in Hepatic Disease, J. A. M. A. **85:** 1187-1193 (Oct. 17) 1925.
26. Keith, N. M.; Smith, Florence H., and Whelan, Mary: The Therapeutic Use of Diets Low in Water and Mineral Content, Arch. Int. Med. **37:** 550-558 (April) 1926; J. Am. Dietetic A. **2:** 233-245, 1927.
27. Jacobs, M. F., and Keith, N. M.: The Use of Diuretics in Cardiac Edema, M. Clin. N. Amer. **10:** 605-610 (Nov.) 1926.
28. Blum, L.; Aubel, E., and Hausknecht, R.: L'action diurétique des sels de calcium dans la néphrite avec oedèmas, Bull. et mém. Soc. méd. d. hôp. de Paris **46:** 206-214 (Feb. 3) 1922.
29. Müller, Friedrich: Personal communication to the authors.
30. Rowntree, L. G.: Personal communication to the authors.
31. Kempmann, W., and Menschel, H.: Zur Wirkung der Euphyllindiurese auf den normalen und gastörten Wasseraushalt, Klin. Wchnschr. **4:** 308-310 (Feb. 12) 1925.

by a reduction of dosage or the omission of these drugs for a few days. In patients with the comparatively rare complication of renal insufficiency, acidosis and nitrogen retention occasionally develop after the administration of ammonium salts. The toxic effects of merbaphen are similar to those produced by other mercurials.

The toxemias associated with portal cirrhosis are but little understood, and cannot be clearly differentiated

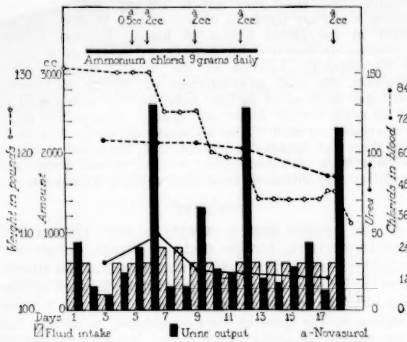


Chart 3.—Successful treatment of portal cirrhosis with ascites.

by any clinical or laboratory criteria now available. The principal clinical features are confusion, delirium and great prostration, progressing finally to coma and collapse; constant or significant chemical changes in the blood have not been demonstrated. These toxemias may occur spontaneously or may follow paracentesis abdominis. The etiologic relation of the administration of ammonium salt and merbaphen to such conditions has not been established definitely; time and further experience with the treatment will be necessary before this point can be decided. However, in the interest of greater safety, it is well to use caution in cases in which jaundice or high grades of dye retention exist, or the general condition of the patient is poor. The clinical course of such toxemias may be illustrated by the following case:

CASE 1.—A woman, aged 50, had suffered from marked ascites and other characteristic evidence of portal cirrhosis for three months prior to admission. Chart 3 shows the prompt and satisfactory response to treatment. She returned to the hospital three months later, in poor condition, and eventually died in coma. In chart 4 the water balance and the chemical changes in the blood during the second period in the hospital are represented graphically. The progressive fall in plasma chlorides was of interest; the elevation of blood urea was probably secondary to urinary retention. Jaundice was not present. It will be noted that the urinary output was adequate throughout, although there was not any response to diuretics. At necropsy a marked degree of portal cirrhosis with degeneration of the hepatic parenchyma was found.

The treatment of these toxemic states associated with portal cirrhosis has been most unsatisfactory; glucose solutions administered intravenously may produce transitory improvement, and frequently will produce temporary recovery from deep coma. Ultimate recovery, however, is rare. It is important to note that many of the cases which are resistant to treatment are those in which the most extreme degrees of hepatic injury are present, as indicated by dye tests; in these a fatal outcome is often to be expected regardless of the therapeutic measures employed.

PREOPERATIVE TREATMENT

Methods for the preoperative preparation of jaundiced patients are well known, and are not detailed here. Walters [32] has advocated a method at the Mayo Clinic which has substantially reduced operative mortality from hemorrhage. This consists of the administration of calcium chloride intravenously if coagulation is delayed. Transfusion is employed in cases in which calcium is not of any avail.

POSTOPERATIVE TREATMENT

Walters and Parham [33] have described two fairly distinct types of toxemia which follow operative procedures in cases of obstructive jaundice; one of these is associated with diminished secretion of bile and urine, together with increasing blood urea and bilirubin; the second is characterized by a profuse flow of very dilute bile, with consequent dehydration, exhaustion and collapse. The complete picture of hepatic insufficiency as described by Mann in the dehepatized animal has not been encountered clinically, although Wilder and Wetherby [34] have noted two cases of hepatic toxemia characterized by recurrent hypoglycemia. For this reason it is probably advisable to avoid the term "hepatic insufficiency" and to classify each case with reference to its own particular metabolic disturbance.

The essential feature of the medical management of postoperative toxic states in hepatic disease is individualization. The administration of water is perhaps the most important single factor in treatment. The amount of fluid which passes through the liver in health is considerable; with external drainage of the common bile duct from 500 to 1,000 cc. of water is lost to the organism daily, and this, of course, must be replaced. In the toxemic states associated with failing secretion

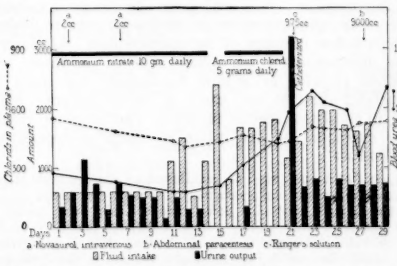


Chart 4.—Same case as shown in chart 3. Unsuccessful treatment of portal cirrhosis with ascites, three months later.

of bile and rising levels of blood urea and bilirubin the need for an increased intake of fluid is imperative. Whether alkalis, salt or glucose should also be given depends on the associated clinical and laboratory data.

The effect of the liver on carbohydrate metabolism and the necessity for an increased supply of carbohy-

32. Walters, Waltman: Preoperative Preparation of Patients with Obstructive Jaundice, Surg. Gynec. Obst. **33**: 651-656 (Dec.) 1921.

33. Walters, Waltman; and Parham, Duncan: Renal and Hepatic Insufficiency in Obstructive Jaundice, Surg. Gynec. Obst. **35**: 605-609 (Nov.) 1922.

34. Wilder, R. M., and Wetherby, M.: Personal communication to the authors.

drate in hepatic injury from specific poisons has already been mentioned. In toxemias associated with obstructive jaundice, the intravenous administration of glucose exerts a most favorable action, and its use in this condition has been stressed by Judd and Burden,[35] and others. The relation of the liver to the metabolism of salt and alkali is not so well understood, nor so generally appreciated. Small quantities of inorganic material (about 1 per cent) are found in the bile of man; this consists chiefly of the chlorides of sodium and potassium, with smaller quantities of iron, magnesium and calcium. The minerals thus lost may have an important effect on the organism, as is shown by the loss of inorganic salts from the bones of dogs with biliary fistula; this may lead to atrophy of bone and spontaneous fracture (Whipple).[10] The loss of these salts, together with the loss of sodium which is in

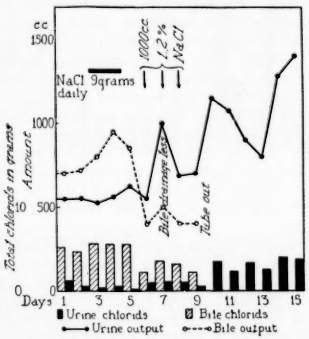


Chart 5.—Effect of sodium chloride on postoperative hepatic toxemia.

combination with the bile acids, may conceivably produce a considerable reduction in the fixed mineral bases of the organism. It is not known whether these factors are of any importance in the relatively acute toxemias which follow drainage of the common duct. However, the administration of dilute aqueous solutions of sodium chloride or sodium bicarbonate may have a beneficial effect in such cases, in certain instances acting in an almost specific manner. The following cases are examples of the value of such postoperative treatment:

CASE 2.—A man, aged 64, manifested an obscure toxic state seven days after cholecystostomy. Values for blood urea, carbon dioxide combining power, and chlorides were normal; the output of urine had decreased to 500 cc., and its content of chlorides was found to be low. Sodium chloride was given by mouth for two days, with slight increase in the drainage of bile, and also in the total chloride excreted by this route. The patient's general clinical condition did not improve and on the tenth day 1,000 cc. of 1.2 per cent sodium chloride solution was given intravenously. There was a marked increase in the output of urine the following day, and a decrease in the drainage of bile. This treatment was repeated on two successive days; the output of urine increased rapidly and the patient's general condition was much improved, external drainage of bile diminishing rapidly. He was able to leave the hospital ten days later, and has remained well (chart 5).

CASE 3.—A man, aged 45, was admitted to the hospital in a state of collapse, three weeks after an operation for choledochostomy. Bile had been draining exceptionally profusely, and the patient had felt fairly well until two days before admission, when he began to vomit and fail in strength. He was definitely hyperpneic and very weak. The carbon dioxide combining power of the plasma was 24 per cent by volume, and the serum bilirubin 1.07 mg. for each hundred cubic centimeters. Following the intravenous administration of a liter of 10 per cent dextrose and 2.5 per cent sodium bicarbonate solutions on each of two successive days, the patient's condition was considerably improved, but bile was absent from the stools and bile continued to drain in greatly increased amounts. The blood urea rose to 108 mg., and the carbon dioxide combining power to 40 per cent by volume. At the height of the illness a test of hepatic function (bromsulphalein) showed dye retention, graded 3, indicating injury to the excretory function of the liver. Ten days after admission, the oral administration of sodium bicarbonate was begun in doses of 16 Gm. daily, together with oxgall in full doses; a liter of 10 per cent glucose solution was given intravenously on each of two successive days. On this treatment there was remarkable improvement; the blood urea and carbon dioxide combining power reached normal levels, and the patient was dismissed from observation a week later.

35. Judd, E. S., and Burden, V. G.: Obstructive Jaundice, Am. J. M. Sc. **169**: 888-896 (June) 1925.

SUMMARY

At the present time a number of new clinical and laboratory criteria for the study of hepatic disease are available; these additions to our armamentarium should be of assistance in the management of diseases of the liver. While there have not been any noteworthy advances in the cure of hepatic disease, a number of symptomatic remedies have been introduced which seem to be of definite value. The preoperative preparation and postoperative management of jaundiced patients has been improved, and various measures have been successfully employed for the treatment of various types of postoperative toxemia in this group. While much of the treatment mentioned is empiric, clinical and experimental evidence seems to justify its use. The small successes thus far attained should encourage further studies in the treatment of hepatic disorders.

ABSTRACT OF DISCUSSION

DR. NORMAN M. KEITH, Rochester, Minn.: These studies in the treatment of liver disease show a definite advance from older methods. The use of mild mercurous chloride as advised by Dr. Eppinger and worked out further by Dr. Weir and Dr. McVicar is very important in the treatment of pruritus. In regard to the use of diuretics, I think that Drs. Snell and Weir have well shown several points that are of great importance. First they have pointed out that a splendid reaction is obtained at one time and not at another. Why that is, I do not know. I think that fact may be a future point of attack which may give us some exact information, so that we shall know beforehand when to give such drugs and when not. It also means that in certain cases we should be persistent in the treatment. Dr. Snell has emphasized the fact that when one does get a good response, it may be of prolonged benefit to the patient, while in other cases the ascites recurs rapidly, and continued use of these therapeutic measures is necessary. The exact mode of action of these diuretics is very difficult to determine. The theory that the diuretic has some specific action on the remaining liver cells is, I think, possibly the best suggested explanation. Of course, we know from the work of McIndoe and Counseller that the portal circulation is largely put out of function in portal cirrhosis. There is some evidence from the work of Dr. Stahl at McGill University that these mercury compounds do act on the tissues generally, and in that connection I would point out that we must, in thinking of diuretics, get away from considering simply the kidneys. We must think of the kidney, of course, but we must also consider the water reservoirs of the body and the reaction of these mercurials and acid salts on the tissues generally. I feel that this preopera-

tive medical treatment of jaundice cases is a true advance, particularly in protecting these patients from hemorrhage and subsequent surgical shock.

DR. A. M. SNELL, Rochester, Minn.: There is one point which might be added in regard to the cause of death in portal cirrhosis. In our series, fatal gastro-intestinal hemorrhage occurred in half the cases; hepatic toxemias and intercurrent infections also figure heavily as causes of death. McIndoe has shown that there is always an ample residue of normal hepatic tissue, and that the primary failure is of the circulation. He has shown that nearly 100 per cent of the portal blood is short circuited through the collateral circulation. It would therefore seem advisable to consider the question of performing an Eck fistula, that is, an anastomosis between the portal vein and the inferior vena cava, as a means of reducing the load on this collateral circulation and therefore diminishing the probability of gastro-intestinal hemorrhage.

THE SPECIFICITY OF THE MINOT-MURPHY DIET IN PERNICIOUS ANEMIA*

I. C. BRILL, M.D.
PORTLAND, ORE.

During the past year, I have treated by the Minot-Murphy method ten cases of pernicious anemia and four cases of severe secondary anemia. In the latter series were included two cases in which the anemia was the result of more or less continuous bleeding, over a long period of time, from the uterus and the rectum, respectively. In both instances the lesions were benign and were removed by operation before the special diet was commenced. The third case was one in which the anemia was apparently due to syphilis, and treatment for the latter was carried out, together with the application of the dietary measures. In the fourth case the anemia resulted from a gastric carcinoma. The growth was confined to the greater curvature of the stomach, about two-thirds up on the cardiac end, and although it was large and deemed inoperable, it did not cause obstruction and did not interfere with the patient's ability to take the full diet during the entire period of observation.

Blood Changes in Ten Cases of Pernicious Anemia and Four Cases of Secondary Anemia Treated by the Minot-Murphy Diet

	Case	Hemoglobin Percentage		Red Blood Cells	
		Admission	Discharge	Admission	Discharge
Pernicious Anemia	1.....	23	93	1,280,000	5,000,000
	2.....	32	95	1,380,000	5,200,000
	3.....	38	100	1,740,000	5,330,000
	4.....	30	100	1,360,000	5,120,000
	5.....	34	100	1,250,000	5,290,000
	6.....	45	80	1,960,000	3,700,000
	7.....	81	111	3,710,000	5,010,000
	8.....	56	85	3,340,000	4,340,000
	9.....	40	98	1,330,000	4,390,000
	10*....	24	65	1,000,000	3,270,000
Secondary Anemia	1.....	43	62	3,270,000	3,990,000
	2.....	48	65	3,000,000	3,750,000
	3.....	29	33	2,080,000	2,660,000
	4.....	28	28	2,580,000	2,460,000

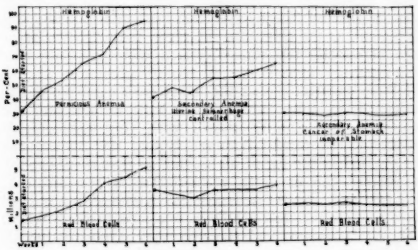
* This patient remained in the hospital only thirteen days.

The results obtained in these two groups of cases are briefly indicated in the accompanying table. It will be seen from an examination of the tabulated results that in the pernicious anemia group there is a steady, uniform and rapid rise in both hemoglobin and red blood cells. On the other hand, in the secondary anemia series there is but a slight rise in the hemoglobin and in the number of the red blood cells in the three cases in which the cause of the anemia had been removed before the diet was begun (cases 1, 2 and 3); while no change at all is noted in the one instance (case 4) in which the cause was an inoperable carcinoma.

The accompanying chart illustrates graphically the striking difference in the hemoglobin and red blood cell curves of the two series. The one pernicious anemia case selected for this chart is quite typical of the entire group which it represents.

COMMENT

While no definite conclusions can be drawn from the study of a comparatively small group of cases, the results are nevertheless suggestive. The uniformity with which the pernicious anemia series responded to the diet, while four consecutive cases of secondary anemia treated under exactly the same condition failed to show a similar response, is highly suggestive that the diet used furnishes a therapeutic principle specific for pernicious anemia. Furthermore, when we take into consideration the singular regularity with which the Minot-Murphy diet causes, in pernicious anemia



Effect of the Minot-Murphy diet on the hemoglobin percentage and red blood cell count per cubic millimeter in one case of pernicious anemia and in two cases of secondary anemia.

cases, a restoration of the blood to an almost normal condition independently of any other therapeutic measures tending to remove any known or unknown causes of the disease, it would appear not at all unreasonable to assume an etiologic relationship between the disease and this principle supplied by the diet. In other words, the foregoing considerations would appear to justify a theory that pernicious anemia is due to a lack in the body of a necessary metabolic substance bearing a relation to this disease not unlike the relation which insulin bears to diabetes, and that this substance is partially supplied by the Minot-Murphy diet. For if the benefit obtained in pernicious anemia from the use of the Minot-Murphy diet is the result of a nonspecific stimulation of red cell formation by the "complete proteins" or the "nucleoproteins" furnished by the diet, it would be difficult to explain why similar stimulation is not observed in cases of secondary anemia.

700 Journal Building.

* From the Medical Clinic of the University of Oregon Medical School.

Changes with Age.—There are physiologic changes which are characteristic of various ages. Change is most rapid in infancy and early childhood, but even then the general rule is that developmental changes are gradual, not sudden.—Report, Joint Health Committee, Health Education, p. 28.

EFFECTS OF COMBINED RADIATION AND LEAD THERAPY*

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NEW YORK

In a recent paper, Blair Bell [1] has called attention to the fact that he gained the impression that a combination of lead suspensoid, injected at suitable intervals and doses, increased the sensitivity of certain neoplasms to the action of the roentgen ray. In a previous paper I [2] presented certain evidence, after experimental work with animal tumors, that this was the case, and in the present paper I report the results of the continuation of that investigation.

It is obvious that final conclusions on the matter must be based on experiments with human material, but it is a great advantage in preliminary research to study the effects of the combination of lead and roentgen ray on transplanted animal tumors, because these tumors, owing to their long period of cultivation, have become what may be termed a standard biologic material, the lethal dose of which to radiation does not fluctuate. The proof of this lies in some still unpublished experiments of my own showing that mouse sarcoma 180, for example, has not changed in its lethal dose as regards radium for a period of twelve years. As the radium filters have been kept intact during this time, and as the tubes are the same, the original dosage can be exactly reproduced, which is not possible with roentgen-ray apparatus. A second advantage of this biologic material is that the lethal dose has been determined from time to time with both radium and the roentgen ray, and is known with very considerable accuracy. A third advantage is that the tumors can be grafted in the leg of an animal, so that roentgen-ray exposures can be given without causing the death of the carrier. The rat or mouse is covered with a curved lead plate which has a hole in one side through which the leg is drawn, and the necessary exposure, which would certainly result in the death of the animal if the entire body was irradiated, can be given with practically no mortality. The lethal exposures, as I have repeatedly shown, vary with different tumors, even though they possess the same morphology.

The two tumors used in this experiment were rat sarcoma 10 and the Flexner-Jobling rat sarcoma. The sarcoma is considerably more malignant than the carcinoma, growing with extraordinary rapidity, and causing the death of the animal in a few weeks. For this tumor approximately six erythema doses, or 3,000 electrostatic units at 150 kilovolts, are required to kill all the tumor cells and prevent recurrence. The Flexner-Jobling rat carcinoma can be killed in most instances with from three and a half to four erythema doses, or 2,000 electrostatic units. These doses are obtained through a very small portal, as the diameter of the tumor when irradiated is not more than 1 cm. The roentgen ray used is generated at a voltage of 150 kilovolts, and the filtration used was in all cases 3 mm. of aluminum, which gives a beam sufficiently homogeneous to penetrate through the entire thickness of the small tumor. The leg is so supported that very little back scatter can occur, except from a board on which the animal is stretched. This board is 2 or 3 cm. from the leg, and every precaution is taken to avoid direct irradiation of the animal. The results are seen in the accompanying charts. With rat sarcoma 10, little effect was produced by the injection of lead as administered in this series of experiments. In most, a single injection of 1 mg. was given intravenously into the animal, and the exposure to the roentgen ray was given the following day. Some of the animals had three intravenous injections of 1 mg. of lead. They bear this very well, the lethal dose being about 4 mg. at one time; but considerable anemia is produced by carrying on a series of six injections of 4 mg. a week apart, such as is recommended for human beings; and as it is extremely difficult to perform a satisfactory transfusion in rats, the saturation of the body with lead which occurs in human patients is difficult to obtain. With sarcoma 10, the tumor grows so rapidly that most of the animals die in four or five weeks. It will be noticed that the lead alone did not produce any effect on the size of the tumor, all the outlines being drawn to the same scale. As a matter of fact, if the tumor is cut across, a very considerable necrosis is observed, about 90 per cent of the total bulk of tissue being in a necrotic state; but the shell remaining, which

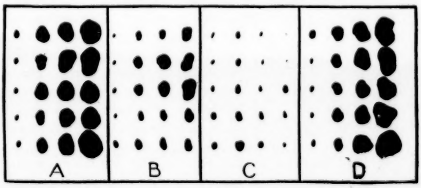

Chart 1.—Rat sarcoma 10: *A*, lead alone; *B*, lead and four and one-half erythema doses of roentgen ray; *C*, no lead and five erythema doses of roentgen ray; *D*, untreated controls.

lead does not destroy, contains an ample number of viable cells, and from this shell growth continues. There is very slow absorption of such necrotic material in animals, owing to the lack of proteolytic ferments in the leukocytes, so that the lead apparently does not cause any change in the size of the tumor.

It will also be seen from chart 1 that even the addition of considerable doses of roentgen ray made very little difference in the growth of the tumor, so that the lethal dose for the tumor was the same with or without lead. It is seen, therefore, that in a very highly malignant growth of this type the combination of lead and the roentgen ray was of no more value than the roentgen ray alone.

On the other hand, when the Flexner-Jobling rat carcinoma, which grows somewhat more slowly and is less prone to extensive central necrosis even after the lead treatment was used, it is evident from chart 2 that the administration of even very small doses of lead, 1 mg. in a 60 to 100 Gm. rat, made the tumor more sensitive to radiation. The gain seems to be somewhere in the neighborhood of 20 per cent; that is, instead of having to give four erythema doses to kill the tumor, three will produce marked reduction in size if lead has been added. It is obvious that this is a distinct gain in therapy, if it can be applied to human beings. It corresponds pretty closely to the estimation made by Wintz as to the efficiency of his procedure by

* Read before the Section on Radiology at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 19, 1927.

* This work has been done at the Institute of Cancer Research of Columbia University in collaboration with Prof. W. Blair Bell and the Liverpool Cancer Committee.

1. Bell, W. B.: Lancet **1**: 267-276 (Feb. 9) 1924.
2. Wood, F. C.: Use of Colloidal Lead in the Treatment of Cancer, J. A. M. A. **87**: 717 (Sept. 4) 1926.

which copper is introduced by cataphoresis into the tissues previous to irradiation.[3]

The charts do not by any means represent the entire series of observations, which run into the hundreds, but typical samples were selected and recorded. The lead used was the original Blair Bell preparation. I have tried a number of other combinations, either submitted by investigators for testing on tumors or made up in my own laboratory, and did not find any striking differences between them. Some of these preparations have been organic compounds of lead, but they did not seem to be any more effective on the tumor than the rather coarse suspensoid which Blair Bell has devised. A suspensoid of lead carbonate or lead hydrate is efficient in about the same proportion as the original mixture. Metallic lead seems to be less efficacious, a conclusion to which Martland [4] has drawn attention from studies in the human being. Certain other combinations have been tried, though the results are not so clear. It has been suggested by Mayer [5] that the injection of dextrose might stimulate the tumor cells to divide, and that then irradiation would be more efficacious, as it would reach the cells at a time when they were dividing. Mayer has published some preliminary results on patients which to a certain extent justify the statement that occasionally the tumor seems to be more sensitive. In animals the injection of 5 mg. of dextrose per gram of body weight and irradiation on the following day seems to increase the susceptibility of the tumor to lead, but control injections of dextrose without the roentgen ray or without lead seem also to check the growth of the tumor. Whether the dextrose interferes with the health of the animals in some way—and interference with health is well known to inhibit growth of transplanted tumors—or whether it has the stimulating effect that Mayer assumes that it will have, I cannot say. The experiments so far have been carried out on only a few hundred tumors, and final conclusions cannot be drawn. It is certain, however, that no astonishing effects can result from the injection of dextrose, and if the tumor is stimulated, there is always a risk in the human being of also stimulating unknown metastases in some region of the body where roentgen irradiation is not given, and thus, while benefit may accrue in the irradiated area, other portions of the tumor will be induced to grow at an increased rate.

In my opinion the action of the lead in all these cases is solely a toxic one, and I have called attention to the fact that a large series of experiments by Holthusen and others have cast grave doubts on the possibility of such minute amounts of metal acting as a radiator of secondary rays. Rather it must be that the lead poisons the tumor to a certain extent, and the roentgen ray carries the destruction still further. In a moderate number of human patients I have been able to confirm Blair Bell's ideas of the very considerable value of the combination of lead with the roentgen ray. I am of the opinion that when the matter is sufficiently studied it will be found that in a certain number of human radiosensitive tumors the administration of lead will bring such growths within the range of destruction by roentgen irradiation. That all tumors should be so influenced is very questionable, for we know that there are human tumors in which ten erythema doses are still unable to cause complete destruction of all cells. So far as can be judged, such neoplasms are out of the range of all present radiation therapy, whether combined with lead or not. But there is one factor which is important and which is easily observable in animal tumors. Whenever large doses of lead are given, close to the lethal limit, a certain number of tumors are markedly affected; they may shrink down owing to the extensive necrosis, and are apparently cured; but if the remnant is excised, and a small healthy fragment is found and inoculated into a fresh animal, this fragment goes on with its old rapid growth rate, showing that no permanent harm has been done to the cell. If the same experiment is tried with the roentgen ray, giving a sublethal dose and then grafting, a tumor may result; but instead of appearing within a week or two it may not appear for three months. This is probably due to the fact that the roentgen ray causes serious damage to the nuclear structures and prevents cell division for a period.

Roentgen irradiation also, as is well known, interferes greatly with the circulation by causing thickening of the walls of the terminal arteriole, thus diminishing the food supply. In similar conditions highly malignant cells can be kept from growth for a long time, as has been shown in some very interesting experiments done by Dr. Jacob Heiman in my laboratory, where fragments of a Flexner-Jobling rat carcinoma were transplanted into the center of a benign fibro-adenoma

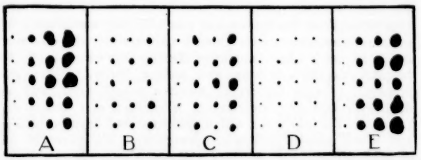

Chart 2.—Flexner-Jobling rat carcinoma: *A*, lead alone; *B*, lead and three erythema doses of roentgen ray; *C*, no lead and three and one-half doses of roentgen ray; *D*, no lead and four erythema doses of roentgen ray; *E*, untreated controls.

of the rat. When this is done, the growth of the carcinoma is practically suspended. The tumor is unable to escape through the dense surrounding connective tissue and receives very little nourishment, and, while a few cells survive, the number is small. If such tumor remnants are removed from the center of the fibro-adenoma after residence there for some months and transplanted to a new host, they grow with all their old vigor and kill the animal in a few weeks. This phenomenon of growth inhibition in an avascular connective tissue, which is initiated by the vascular sclerosis following roentgen-ray treatment, is the scientific basis for using irradiation in connection with lead therapy. The lead may do its part, but that action is somewhat temporary, while the roentgen ray completes the process by its lethal effect on the cells and its vascular action.

I believe that in the future, instead of lead being used as a primary type of therapy, and the roentgen ray as an adjuvant, the situation may be reversed, and the radiotherapeutist will give lead to the patient in order to increase the effectiveness of the roentgen ray. Whether this opinion is valid can be determined only by the most careful studies on human beings and on animals.

SUMMARY

1. The combination of lead and the roentgen ray is more effective than either alone on a rat carcinoma of high virulence.

3. Wintz, in Zweifel-Payr: Klinik der bösartigen Geschwülste, Leipzig, S. Hirzel **3**: 467, 1927.
4. Martland, H. S., and von Sochocky, S. A., with the collaboration of Hannah Hoffman: Stable Colloidal Lead in Treatment of Cancer, J. A. M. A. **88**: 911-917 (March 19) 1927.
5. Mayer, E. G.: Strahlentherapie **23**: 604-630, 1926.

2. On a rat sarcoma of still greater growth capacity, no such increase in the effectiveness of the roentgen ray can be observed.

3. A preliminary study of the effects of the addition of dextrose to the lead mixtures, or of preliminary injections of dextrose followed by lead, has shown that the dextrose does not seem to increase the efficacy of the lead in its action on tumors, nor does it apparently increase the efficiency of the roentgen ray.

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ABSTRACT OF DISCUSSION

DR. J. SHELTON HORSLEY, Richmond, Va.: I have not had any experience with any mouse or rat tumor, but I have treated four clinical cases of cancer with colloidal lead. One was a cancer of the stomach in a young woman who was very anemic. Approximately 205 mg. of lead was given in two doses. Transfusions apparently were without benefit. She died fifteen days after the first dose of lead. The necropsy showed a very extensive malignant growth, and a section of the tissue taken before the lead treatment was begun and a section taken afterward did not show any material difference in the histologic changes of the neoplasm. Another case was one of adenocarcinoma of the right ovary with numerous metastases in the peritoneal cavity. The original growth was removed. The patient had three doses of lead, representing 268 mg. She became very sick, vomited coffee-ground material for two or three days, and finally was benefited by an intravenous injection of 5 per cent dextrose in Ringer's solution. This was administered continuously for about two days, and then a transfusion was done. After recovering from the nausea and vomiting, she was given a few intensive roentgen-ray treatments. Apparently, she was much benefited for a while, and after staying fifty-two days in the hospital she left, looking and feeling better. There was, however, a rapid recurrence about a month after, and she died with extensive metastases. The third case was a carcinoma of the breast for which operation had been performed, and which showed extensive metastases. We gave 286 mg. of lead intravenously at three different times. Biopsy of the nodules before and after the treatment showed no change in the cells. The patient is still living, though apparently not much benefited. The fourth patient was a young girl, aged 14, with a very malignant teratoma of the ovary. It had been operated on, and there had been a rapid recurrence. In fact, the surgeon who operated told me that when he removed the original growth there were some evidences of metastases. She was given 232 mg. of lead in three doses. An interesting thing about this case is that the coagulation time increased to nineteen minutes, in spite of transfusions and of attempts to give calcium intravenously. She left the hospital at the end of thirty-four days, but soon after leaving she had hemorrhages from the mouth and stomach, and died apparently as a result of the hemorrhages but without improvement of the malignant condition. Histologic examination of the cells before and after treatment showed no apparent difference. I have abandoned the treatment temporarily.

DR. H. J. ULLMANN, Santa Barbara, Calif.: We have abandoned the use of the metallic colloid. We have had the same experience as Dr. Horsley had. We have had a drop in the hemoglobin from 100 to 30 per cent and from 78 to 28 per cent, and these patients had received smaller doses than Dr. Horsley used. We have noticed marked effects on some tumors and none on others. One was a carcinoma of the ovary which had been operated on and which was much like the case Dr. Horsley mentioned. The metallic colloid was given but we were forced, because of the effect on the blood, to stop treatment and give a transfusion. There was severe nausea and vomiting. The roentgen ray was tried, but even the smallest doses produced vomiting. Later, the patient had several attacks of vomiting without treatment having been given. Several weeks later the phosphate was tried; it resulted in nausea and vomiting also, but without the anemia. Today she is feeling quite well, although she is carrying a tumor that extends above the umbilicus. We saw practically no effect on the tumor from the lead except a temporary reduction in size.

DR. ADOLPH BONNER, Brooklyn: I, too, was one of those who submitted patients to the lead treatment with very disastrous results. To my mind, it is not very helpful at the present. In carcinoma of the cervix, roentgen-ray and radium therapy hold out the best hope. Carcinoma of the uterus is a different matter. All the patients with carcinoma that I have been able to follow up—and nearly every case was in the body of the uterus—are still alive. Those who have carcinoma of the cervix, who are still alive, are so simply because they have not been treated long enough for the results to be fatal. A little girl, aged 12, who had a basal cell carcinoma of the cervix, was treated with the roentgen ray and radium two years ago, and she is doing very well.

DR. F. C. WOOD, New York: I am in hopes that the experimental work which I have done may lead us ultimately—and this is only a preliminary part of my work—to the position where we may use the lead in small doses, which are entirely harmless to the patient, to help out the roentgen ray and radium. I think that is the direction in which advances will be made. The sclerosing action of the roentgen ray on the vessels and on the connecting tissues holds back the growth of the tumor cells, and in animals tumors will not recur for three months after they had been roentgenographed, which ordinarily will reappear in a week after lead treatment, thus showing a distinct slowing effect which means four or five years in the life of a human being. If the lead can be used in small doses so as not to endanger the patient and can then be combined with the roentgen ray, I think that we shall get good results in the future in those tumors which happen to be susceptible, but it means a great deal of experimental work and thorough clinical studies before exact results can be obtained.

THE COMBINATION OF COLLOIDAL LEAD AND IRRADIATION IN CANCER THERAPY *

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In a preliminary report, read before the Radiological Society of North America in Milwaukee, in December, 1926, I [1] described at length the difficulties in manufacturing a pure metallic lead colloid with even reasonable keeping qualities. I also described our final preparation, the one used in our early work, which could be kept at room temperature for from weeks to months.

The clinical and toxic effects of the metallic colloid varied enormously. There were regressions, liquefactions, and no demonstrable effects on the tumors in different individuals. Two patients came to autopsy with marked liquefaction of metastatic foci in the lungs and liver. Death occurred in each case from a pneumonitis developing about the pulmonary nodules. Figure 1 shows a cyst of the dome of the right lobe of the liver in the first of these cases, 8 cm. in diameter, and filled with gray-white fluid. Figure 2 shows another cyst on the under surface of the left lobe of the same liver, 2.5 cm. in diameter, with a similar content and surrounded by a rim of tumor tissue 1.5 cm. wide. There was extensive fatty change in the parenchyma of the liver, from one fourth to one third being replaced by fat. Many small regions of tumor cells were seen in the wall of each cyst, and many of these were shrunken and distorted. Unaltered tumor cells were

* Read before the Section on Radiology at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 19, 1927.

1. Ullmann, H. J.: The Use of Colloidal Lead in the Treatment of Cancer After the Method of W. Blair Bell, Radiology **8**: 461 (June) 1927.

also seen. The wall of the larger cyst was mostly of fibrous tissue with only a few islands of tumor tissue. These tumors were primary in the neck, and were diagnosed endothelioma by Dr. F. R. Nuzum. In this patient at death the large primary cervical tumors had regressed by shrinking and fibrosis until the neck was nearly normal in outline. During three months 221 mg. of colloidal metallic lead had been given in approximately three equal doses. In no case coming to autopsy in which the total dosage of lead was less than 200 mg. was any appreciable gross effect on the tumors demonstrated.

Fig. 1.—Cystic degeneration of liver tumor with practically complete disappearance of tumor cells.

Following the injection of the metallic colloid, lumbar pain was constant and sometimes persisted for twenty-four hours. Abdominal pain was an occasional but not a regular symptom. In some instances there was a chill, and a sharp temporary rise in temperature was fairly constant. Nausea, vomiting and anorexia were the rule, especially after the first dose, as was pain in the tumor with moderate swelling.

Hematuria, from twenty-four to forty-eight hours after the injection, was found in nearly every instance but soon disappeared. An acute nephritis and a lowering of kidney function, as shown by dye excretion, were practically constant.

The most alarming of all the toxic effects was that on the blood. There was a primary fall in hemoglobin followed later by a decrease in the red cells. Sometimes this was moderate, but often it was both alarming and critical. In two instances, transfusion was necessary after the first dose. In these cases the hemoglobin fell from 100 to 30 per cent and from 78 to 28 per cent in a week, while the red cells dropped from 4,400,000 to 2,200,000 and from 4,700,000 to 2,200,000. Each of these patients had received 90 mg. of colloidal metallic lead in one dose. Stippling of the red cells was constant but did not appear to have any relation to the degree of anemia.

These and other observations led me to believe that there is no doubt that colloidal metallic lead may exert a destructive action on malignant tissue, but at the same time it is so toxic to the organism as a whole that its use is open to question. We were, however, encouraged to go on with the work because of the marked effects on some of the tumors following moderate dosages.

An intensive study was made of the action of lead and its salts on the body, both from the literature and by animal experimentation in our own laboratory, and the following conclusions were drawn. The scope of this paper is too restricted to permit a presentation of the evidence on which I base these conclusions, but similar evidence is presented at length by Bischoff and Blatherwick.[2] These conclusions are best expressed in the following abstract by the authors:

> We believe it is impossible that any colloidal lead, as such, remains in the blood stream after the venous supply has passed the lungs. Colloidal lead, added to blood serum, goes to an oxidized form rapidly. The colloidal lead distributes itself between the serum and corpuscles in approximately the ratio that these components are found in the blood. Colloidal metallic lead has the same effect as lead ions in rendering red cells insensitive to hemolysis in hypotonic solution. In vitro experiments showed that colloidal lead reacts quantitatively with the oxygen dissolved in the blood, and, under certain circumstances, with the combined oxygen. Such experiments indicated that colloidal lead would be rapidly converted to the oxide after intravenous injection. In that case, colloidal lead oxide should be no more toxic than the metal. Experiments with rabbits showed this to be true.
>
> Intravenous injection into rabbits of colloidal metallic lead, colloidal lead oxide, ionic lead, colloidal lead phosphate, ionic lead in blood serum, ionic lead in red cells, and colloidal lead carbonate, were made. The results showed that the colloidal lead phosphate and the ionic lead which had been added to serum were nontoxic. The colloidal lead oxide, colloidal lead, lead red cell reaction product, and ionic lead acetate had the same degrees of toxicity. The results indicated clearly that the form of lead which is toxic is some other reaction product than the phosphate, and that it is formed when the lead ions are added to the blood stream.

Aub, Fairhall, Minot and Reznikoff[3] present quite conclusive evidence that the anemia of lead poisoning is caused by the destruction of the red cells in the circulating blood. The action, according to these authors, can be entirely explained by the union of lead and the inorganic phosphate of the cell. When this occurs, free hydrochloric acid is liberated and tribasic lead phosphate is formed. This results in a markedly increased fragility, and the destruction of the cells by the trauma of circulation. Hemoglobin does not react with lead, and the effect of lead on the cells is a surface reaction. The cell changes from an elastic, distensible

Fig. 2.—Incomplete cystic degeneration of liver tumor, same case as figure 1.

2. Bischoff and Blatherwick: J. Pharmacol. & Exper. Therap., to be published.
3. Aub, Fairhall, Minot and Reznikoff: Lead Poisoning, Baltimore, Williams & Wilkins Company, 1926.

sac to one that is contracted, relatively inelastic and brittle. There is a compensatory regeneration of erythrocytes and many of these young cells are affected by lead after they enter the circulation, so that their basophilic substance is coagulated or clumped together and they give the characteristic granular appearance known as stippling.

All evidence at hand points to the conclusion that lead is transported in the blood stream as a highly dispersed or colloidal phosphate, and that lead can hardly be present in the blood except in this form. The dibasic lead phosphate always forms under equilibrium conditions, but in a slightly alkaline medium such as that of the body the tertiary salt is the stable form. This tertiary form is inert and harmless under normal conditions of alkalinity, but any local production of acid must transform it to the di-lead phosphate, which is 100 times as soluble. This solubility is markedly influenced by the presence of even small quantities of lactic acid out of proportion to the actual degree of acidity.

Therefore, as lead is apparently changed to the orthophosphate by the organism after it enters the blood stream and, during this process, marked injury to the red cells occurs, and as lead apparently can exist in the body only as the tri-lead or di-lead phosphate for any length of time, we hoped that the use of the colloidal orthophosphate as the primary material would reduce the toxic reactions. We expected that, as malignant tumors contain a certain amount of lactic acid[4] and, as the insoluble salt changes to the 100 times more soluble one in the presence of very small quantities of this acid, the tumors would be affected as by the metallic preparation.

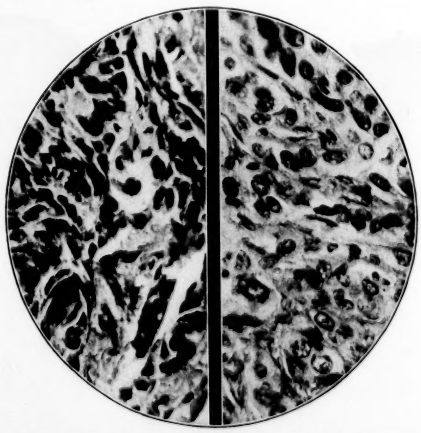

Fig. 3.—Effect of direct injection of colloidal lead phosphate into tumor nodule with untreated nodule section for comparison.

Comparative tests were made on rabbits. Lead oxide colloid, 4 mg. per kilogram, produced a fall of 35 per cent in the hemoglobin of one animal in four days; an ionic solution of lead acetate, 4 mg. per kilogram, 30 per cent in three days. Colloidal metallic lead, 3 mg. per kilogram, produced an average drop of 25 per cent in four animals in from three to four days, while colloidal lead phosphate in doses of from 4 to 16 mg. per kilogram did not have any effect on the hemoglobin of four animals over a period of six days. All doses were calculated in terms of lead element.

The preparation was then tried on patients. As expected, the toxic effects were much less. In one patient the blood picture did not show any important change except an occasional stippling during the administration of 310 mg. in approximately thirty days. There was, however, evidence of plumbism shown by anorexia, some vomiting and muscle pains, after 180 mg. had been given. In an earlier patient, who received the lead in doses of from 80 to 100 mg., the hemoglobin decreased from 80 to 50 per cent, but she has recovered from all the toxic effects without special treatment. The general symptoms were essentially those described in the first case. There has not been lumbar pain, demonstrable clinical effect on the kidneys (in two instances the preparation has been given to individuals with a kidney function test of 0), or liquefaction of tumors in the lung with resulting pneumonitis. Chills and a slight rise in temperature occur as with the metallic colloid. It has been suggested that these are due to the use of gelatin in the solutions. The clinical effect on tumors has been in every respect comparable to that of the metallic preparation. Another advantage of the phosphate preparation is that it keeps indefinitely at room temperature.

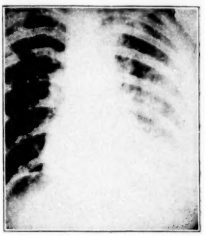

Fig. 4 (case 2).—Metastatic carcinoma of lungs, Dec. 20, 1926.

I feel that it is too early to render statistical clinical reports, but from my experience I believe that lead markedly affects certain tumors and that one of the effects is to render the tumor distinctly sensitive to irradiation. Their sensitiveness does not appear for some little time after an appreciable amount of lead has been given.

Two instances of the effect of the phosphate on tumors are presented and the second illustrates the sensitiveness of leaded tumors to radiation. They are not presented as evidence of the value of the method but as interesting observations.

REPORT OF CASES

CASE 1.—Postmortem examination revealed carcinoma of the liver with metastases to the pancreas, lungs, endocardium, epicardium, left kidney, and subcutaneous tissue. During life, 0.5 cc. of colloidal lead phosphate containing 2 mg. of lead was injected directly into the center of a subcutaneous nodule, and two days later this nodule and a similar one from another area were excised. In sections of the latter the carcinoma cells were round and appeared "healthy," while in those of the former, into which the lead was injected, the cells were markedly distorted and were barely recognizable as carcinoma cells (fig. 3).

CASE 2.—A woman, aged 44, had had a radical resection of the left breast three and one-half years before for carcinoma, and later subcutaneous nodules were removed on two occasions. Roentgenotherapy had also been used. When she was first seen, Dec. 20, 1926, the right breast contained a tumor 7 by 14 cm. in dimensions overlaid by markedly erythematous skin. There was an axillary nodule above this approximately 2.5 cm. in diameter. Both supraclavicular and cervical regions

4. Ewing, James: Neoplastic Diseases, p. 89.

contained multiple nodules. The supraclavicular space on the left contained a hard, tender mass, approximately 4 cm. across. There were multiple cutaneous and subcutaneous nodules in the region of the operative scars, some of which were about to ulcerate. There were multiple subcutaneous nodules on the posterior thorax. There was separation of both retinas, and a slight, painful bulging of the right eyeball. There was a slight productive cough and dyspnea. Both lung fields were mottled (fig. 4).

Colloidal lead phosphate was given intravenously. Following the second injection the cough disappeared, but pain was felt in all the tumors. A primary swelling of the visible tumors occurred, followed by regression. A radium pack applied over the right temporal region produced immediate relief from the pain and swelling. Vision was completely lost at about the midperiod of treatment. Radium packs were applied to the right breast and axilla and the left supraclavicular region followed by immediate regression of the tumors. There had, however, been a reduction in the size of the right breast and complete disappearance of the erythema before radium was used. The subcutaneous nodules regressed steadily although they had not been irradiated, and some in the region of the scar disappeared entirely. When those on the back had regressed two thirds, a biopsy was done and sections were made (fig. 5). The carcinoma cells in the center were round and apparently healthy, while those about the periphery were markedly distorted and similar to those of the nodule previously described into which lead had been directly injected.

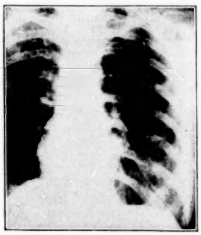

Fig. 6 (case 2).—After injection of lead, March 4, 1927.

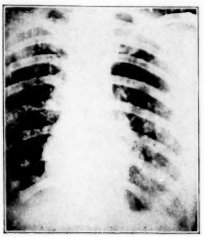

Fig. 7 (case 2).—Same as figure 6, March 30, 1927.

Fig. 8 (case 2). — Appearance, May 5, 1927.

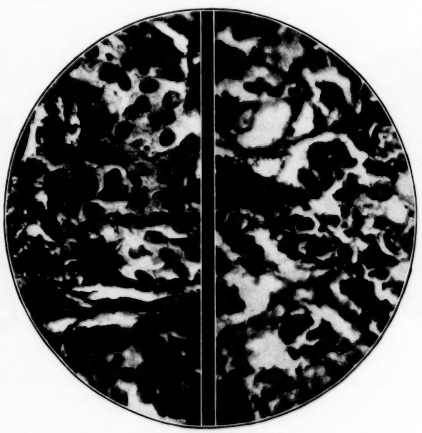

Fig. 5 (case 2).—Effect of intravenous injection of colloidal lead phosphate on subcutaneous nodule.

The change in the lung fields, as shown in figures 6 and 7, is particularly interesting. There was a marked increase in the density and size of the tumor shadows, although the patient was clinically better. This was interpreted as due to an infiltration and swelling of the tumor nodules—a lead reaction. Small doses of roentgen rays were then given over the thorax with the following factors: 200 kilovolts peak; 5 milliamperes; 50 cm. distance; 0.5 mm. of copper plus 1 mm. of aluminum as filter; 24 centimeters square port; five minutes each day, alternately front and back. This dosage produced not the slightest general reaction. When a total of fifty-five minutes' irradiation each on the front and back had been given, another roentgenographic examination of the lungs was made (fig. 8). It showed a marked regression of all the tumor markings. This is the second patient referred to as illustrating the effect on the blood. She received 340 mg. of lead in the form of the phosphate between Dec. 22, 1926, and Jan. 23, 1927, and 30 mg. each on April 12 and April 19, 1927. No further immediate lead treatment is contemplated, but irradiation is now being given over all suspected areas in small fractional doses. May 8, 1927, the cutaneous and subcutaneous nodules had largely disappeared and those remaining were so small that they had become hard to find. The cervical and supraclavicular nodules were comparable to the skin nodules, in that the majority had entirely disappeared. The right breast contained a soft, movable mass about 2.5 cm. in diameter which was still growing smaller, and the large gland in the right axilla could not be palpated. Vision had returned to the point at which faces and general forms could be seen. There was no evidence of chronic plumbism.

CONCLUSIONS

I believe that one problem which must be worked out is that of determining the minimum amount of lead necessary to produce regression when combined with the roentgen ray, so that lead intoxication may be reduced to the minimum. Further, from the results of our investigations, I consider it possible to mobilize the lead stored in the bones after the first course of treatment, so that the patient's tumors may be releaded without injecting more of the metal. We are also experimenting with organic lead compounds, some of which are fat soluble and absorbable through the skin.

Finally, I believe that there is sufficient evidence to warrant intensive investigation either to develop this method of treatment or to prove it useless as soon as possible.

1520 Chapala.

ABSTRACT OF DISCUSSION

DR. O. N. MELAND, Los Angeles: We have used lead in about eighteen cases. The preparation used was prepared by Dr. Ullmann and his associate, Dr. Bischoff. There is no question as to the effect of lead on the tumor tissue itself, but at the same time there is a very profound effect on the organism as a whole. Our experiences bear out Dr. Ullmann's observations. When the massive doses recommended by Bell are used, invariably a very severe systemic reaction occurs, with an occasional local reaction, such as pain in the tumor. When we use small doses to prevent systemic reactions, we fail to produce any retrogressive changes in the tumor. As a result of the treatment, we have had permanent toxic nephritis; these patients died as a result of a combina-

tion of lead and the malignant growth. In no case were we able to give more than a total dosage of 200 mg. of lead, either in two or three large doses or in many small doses. In view of this, we question very much the justification for the continued use of metallic lead colloid. At present we are using colloidal lead phosphate, which is much less toxic, since it is broken up slowly and produces its effect by a minimum reaction. Our experience with the new preparation is too limited to permit us to venture any opinion. In some cases, in which we had a combination of irradiation and lead, the cell became somewhat more sensitive.

DR. FRANCIS CARTER WOOD, New York: Dr. Ullmann's work in testing out all these various colloids is very valuable. I hear that Prof. Blair Bell has now reduced his dose from 100 mg. to 50 mg. The smaller dose is much less toxic, but I still think that the line of Dr. Ullmann's experimentation is a valuable one. If a lead preparation which is only slightly toxic, and which is equally effective on tumors, can be obtained, an important step will have been taken. In my experience, some combination of lead and roentgen-ray therapy is better than either alone.

DR. H. J. ULLMANN, Santa Barbara, Calif.: We could not quite comprehend Bell's early reason for giving the large doses. He stated that if large doses were given, chronic poisoning did not occur, and that the acute poisoning soon disappeared. In one of his last articles, not so recent as the one Dr. Wood spoke of, he advocated administering 300 mg. in thirty days—75 mg. every ten days for four doses. We cannot see why one should not be able to use doses of from 20 to 40 mg., repeated frequently enough to reach 300 mg., in the time specified without increasing the danger of chronic plumbism. We have tried it, and can see little difference in the effects. Therefore, one of our problems is to work out the optimum amount and the spacing of dosages, and to any one who attempts this with either rabbits or human beings, I wish to emphasize the tremendous individual variation in susceptibility to lead. A dose that will hardly affect one rabbit or man may be lethal to another.

THE ANTIRACHITIC ACTIVITY OF MONOCHROMATIC AND REGIONAL ULTRAVIOLET RADIATIONS *

ALFRED F. HESS, M.D.
AND
WILLIAM T. ANDERSON, JR., PH.D.
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In 1923, experiments were carried out to ascertain the length of the ultraviolet waves which are endowed with the remarkable property of preventing or curing rickets. It was found that, in order to be of value, "ultraviolet waves must have a length not longer than 302 or possibly 313 millimicrons." [1] This conclusion was arrived at by means of an extended series of experiments which made use of selective glass filters and has been confirmed by the recent work of Luce.[2] The study served to emphasize the remarkable specificity of waves of light in relation to rickets, showing that a difference of about 20 millionths of a millimeter determined whether ultraviolet radiation was either effective or ineffective in this respect. The data, however, were not sufficiently refined, the analysis of the spectrum not precise enough to warrant a definite conclusion as to whether the intense waves of the mercury vapor arc at 313 millimicrons contributed to the protective action of the shorter radiations. Furthermore, although this study added to our understanding of the activity of the ultraviolet spectrum in the neighborhood of 300 millimicrons, it did not give us any information with regard to the octaves of ultraviolet shorter than those of the sun.

In the following year the scope of ultraviolet irradiation was broadened by the knowledge that antirachitic potency could be determined not only by tests on animals but also by the activation of inert oils and foods, as well as cholesterol. Accordingly, a similar series of experiments with the same filters was carried out, a 1 per cent aqueous suspension of cholesterol being used as a criterion, instead of the direct irradiation of animals fed on a rickets-producing diet.[3] This method led to similar conclusions: that "the intense line of the mercury vapor spectrum 302 millimicrons in length conferred definite protection and that the 313 millimicron waves exerted probably a feeble action in this respect," as well as that "cholesterol is activated by ultraviolet radiations of approximately the same wavelengths as those which have been found to be specific in rickets where animals are subjected to direct irradiation." A new type of filter was used in this study, one containing chlorine and bromine, by means of which the shorter ultraviolet was segregated from the longer waves, allowing the passage of 90 per cent of those 265 and 254 millimicrons in length, and extending down in the spectrum as far as 200 millimicrons. When this filter was used the rats were protected, showing that the cholesterol reacted specifically to radiations in the far ultraviolet. This test indicated strongly that ultraviolet rays shorter than those of the sun are imbued with antirachitic property; the fact, however, that this filter allowed the passage of about 0.1 per cent of radiations between 290 millimicrons and the visible blue detracted somewhat from the scientific accuracy of the result.

There are two important aspects of this subject which have not been answered by previous investigations—one as to whether the radiations from the sun are more or less efficient than the shorter ultraviolet rays produced by artificial sources, such as the mercury vapor and the carbon arc lamps. This is a question of considerable importance in view of the increasing vogue of ultraviolet irradiation. The other relates to the potency of individual wavelengths of the sun and artificial sources of ultraviolet radiation, and has both theoretical and practical significance. Both of these aspects are considered in this investigation and have been made the subject of a preliminary report.[4]

In order to investigate the first of these problems, a series of filters was devised whereby two bands of ultraviolet radiation were isolated, one of which contained rays shorter than 290 millimicrons and the other those between 290 and 313. As is well known, under the most favorable conditions, the shortest of the sun's rays are 290 millimicrons (2,900 angstrom units) in length. The antirachitic activity of these two regional bands was tested by noting their effect on rachitic rats. The technic of segregating these regions was as follows:

The longer band was obtained by a Corning G 585 filter 2 mm. thick and a bromine filter in quartz, as well as a Corning G 986 A and a water filter in quartz. The filters allowed the passage of radiations from 2,900 to 3,660 angstrom

* From the Pathological Laboratory, Columbia University College of Physicians and Surgeons, and the Research Laboratory of the Hanovia Chemical and Manufacturing Company, Newark, N. J.

1. Hess, A. F., and Weinstock, Mildred: Study of Light Waves in Their Relation to Rickets, J. A. M. A. **80**: 687 (March 10) 1923.
2. Luce, E. M.: J. Biol. Chem. **71**: 187 (Dec.) 1926.
3. Hess, A. F., and Weinstock, Mildred: J. Biol. Chem. **64**: 181 (Dec.) 1925.
4. Hess, A. F., and Weinstock, Mildred: Proc. Soc. Exper. Biol. & Med. **24**: 759, 1927.

units and a faint suggestion of red, but no other visible rays, and merely a trace of heat. Nothing below 2,900 angstrom units was obtained by photographing.

To obtain the shorter band a Corning G 986 A, a chlorine and bromine filter in quartz, and a water filter in quartz was used. Nothing shorter than 2,500 angstrom units passed through, and rays 2,800 angstrom units in length were included. There was not more than 0.01 per cent of ultraviolet radiation longer than 2,800; only after one-half hour's exposure to a spectrum plate was there a slight effect. A faint suggestion of red, but no other visible rays or heat were noted.

In both parts of this experiment the amount of light energy received by the animals was identical within experimental error, which in this instance was not very large, amounting to no more than 2 per cent plus or minus. The intensity determined on was based on our experience of a few years ago that it requires approximately two minutes' irradiation at a distance of 3 feet to protect rats from rickets when a new quartz mercury vapor lamp at 75 volts is used as the source of illumination. In order to obtain this intensity, the rats receiving the shorter wavelengths were given 5.96 ergs per second per square millimeter for twenty-eight minutes, whereas those receiving the longer wavelengths received 7.94 ergs per second per square millimeter for twenty-one minutes at the point of irradiation, so that

Fig. 1.—Regional bands of ultraviolet radiations: *A*, waves shorter than sunlight, from 250 to 280 millimicrons (2,500 to 2,800 angstrom units); *B*, waves from 290 to 366 millimicrons (2,900 to 3,660 angstrom units).

the number of ergs falling on each square millimeter of rat in every instance was approximately identical. In several series of tests it was found that both of these regional bands (fig. 1) were effective in curing rickets. The shorter band, comprising radiations below 290 millimicrons, proved the more potent, as evidenced by roentgenograms of the epiphyses and chemical tests of the blood; for example, in the first series the inorganic phosphate of the blood was 4.21 and 3.07 mg. per hundred cubic centimeters, whereas the plasma of the rats treated with the band of longer rays showed figures of 3.31 and 1.95 mg. per hundred cubic centimeters. It is evident, therefore, that very short ultraviolet rays have more intense antirachitic power than the shortest of those from the sun.

The second part of the study was the investigation of several monochromatic waves of ultraviolet radiation. We have had this investigation in mind for some years but have been unable to carry it out owing to the fact that, although individual wavelengths could be isolated, we were not able to obtain them in sufficient intensity for experimental work. Recently, however, it was possible, through improved technical procedure, to produce them in greater intensity, an advance which, coupled with the fact that we could carry out the test by means of irradiating cholesterol rather than animals, enabled us for the first time to obtain satisfactory results.

As stated, the shortest waves of sunlight to reach the surface of the earth are about 290 millimicrons in length, varying in intensity according to the time of the day and the season of the year. When the atmosphere is heavy with moisture, or polluted with smoke or dust, waves shorter than 300 or even 310 millimicrons may be absorbed. As the upper limit of antirachitic activity was found to be in the neighborhood of 313 millimicrons, it is evident that the range of effective radiations is markedly circumscribed by nature and further limited by unfavorable meteorological conditions. Dorno[5] found in Davos, in the Swiss Alps, that during the month of December the shortest radiations that could be registered were approximately 308 millimicrons in length, and these were noted only for a very short period during the middle of the day, and furthermore that radiations as short as 302 millimicrons could not be registered until the month of April. It is evident, therefore, that it is a crucial matter, from a therapeutic point of view, to ascertain whether radiations as long as 313 millimicrons exert antirachitic power and indeed just what are the longest rays that possess this specific virtue. If we are to be in a position to judge whether the sun's rays which are available during the winter months in certain localities and under various meteorological conditions are effective and whether the radiations which traverse the newer preparations of window-glass serve their purpose, we must have exact knowledge in regard to the specificity of wavelengths. It will not suffice to state that a difference of 25 millionths of a millimeter (25 millimicrons) determines whether radiations have or have not specific antirachitic power. The vital question hinges on a much narrower base.

It should also not be forgotten that the intensity of the various wavelengths in the ultraviolet portion of the solar spectrum is by no means the same. There are surprisingly little data on this subject, in fact only one reliable study, carried out some years ago by Fabry and Boisson[6] in Marseilles at approximately sea level. According to these investigators the waves in which we are at present interested, those 314 millimicrons (3,143 angstrom units) in length, are about 750,000 times as intense, and those approximately 302 millimicrons (3,022 angstrom units) about 90,000 times as intense as the shortest of the solar radiations. It is thus apparent that the intensity of the ultraviolet solar rays increases as they become longer, and that there is a noteworthy augmentation about the focal point (313 millimicrons) which we are considering in relation to rickets. The fact is that one wavelength may have hundreds of thousands of times the intensity of another which lies in close proximity within the solar spectrum.

The apparatus employed in obtaining monochromatic ultraviolet waves was as follows:

The source of the light was a perpendicular air-cooled quartz mercury vapor arc lamp. The light was first passed through a hollow water-filled fused quartz lens, 5 inches in diameter, and focusing lenses to the adjustable slit of the monochromator; the slit was $1\frac{11}{16}$ inches in height, and 1.5 mm. in width. The waves were then projected through a collimating quartz lens and spectralized by a Cornu quartz prism. A series of quartz lenses and slits isolated the desired monochromatic wavelength. This technic gave individual wavelengths of which the impurity was too small to affect a sensitive bismuth-silver thermopile after further spectralization, but registered on a spectrum plate after prolonged exposure.

5. Dorno, C.: Strahlentherapie **18**: 721, 1924.
6. Fabry and Boisson: Astrophys. J. **54**: 297, 1921.

The samples of cholesterol that were irradiated with monochromatic light all received the same total amount of light energy; namely, 3.9 ergs a second per square millimeter. The line 3,025 angstrom units (302 millimicrons) had about eighteen times the intensity of June sunlight at Marseilles, and the line 3,130 angstrom units (313 millimicrons) about twice the intensity, so that we secured unquestionably radiations of an intensity greater than that of the sun under the most favorable conditions at sea level. Three lines were singled out for investigation—the very short wavelength 280 millimicrons, as representing a region well below that of the solar spectrum, and the two lines 302 and 313 millimicrons, as comprising the boundaries of the mooted area of the antirachitic region. These monochromatic lines are reproduced in figure 2 and the results of the tests on the rachitic animals are summarized in the accompanying table. It will be noted that the cholesterol which was irradiated with waves 280 millimicrons (2,800 angstrom units), as well as that subjected to waves 302 millimicrons (3,025 angstrom units), in length brought about moderate or marked healing in the rachitic rats, whereas when waves 313 millimicrons (3,130 angstrom units) in length were employed, slight or no healing resulted. It is evident, therefore, that the 313 millimicron waves lie just on the borderline of the effective antirachitic region, and that only very prolonged exposure at this particular level could bring about healing. The tests do not enable a comparison of the potency of the two shorter wavelengths; both are highly effective.

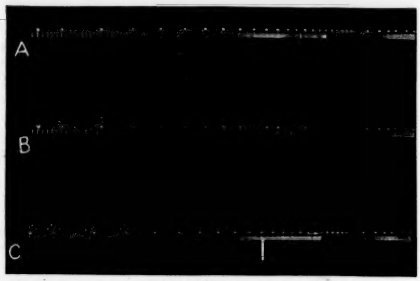

Fig. 2.—Monochromatic ultraviolet waves: *A*, 313 millimicrons (3,130 angstrom units); *B*, 302 millimicrons (3,025 angstrom units); *C*, 280 millimicrons (2,800 angstrom units).

Antirachitic Activity of Various Monochromatic Ultraviolet Waves

Rat Weights, Gm.	Rickets-Producing Diet	Rickets Previous to Test	Supplement to Diet	Healing	Blood Phosphorus (Inorganic) Mg. per 100 Cc.
40-50	Low	Moderate	2.5 mg.	Slight	
50-60	phos-	Moderate	cholesterol	Moderate	
60-62	phorus	Moderate	Wave length,	Moderate	
54-56	84	Moderate	2,800 ang-strom units	Moderate	
90-104	Low	Marked	2.5 mg.	Very slight	2.41
74-64	phos-	Moderate	cholesterol	Marked }	
50-44	phorus	Slight	Wave length,	Marked §	2.98
50-44	84	Slight	3,025 ang-strom units	Marked	
60-52	Low	Moderate	2.5 mg.	Very slight	
70-71	phos-	Moderate	cholesterol	Slight	2.09
110-106	phorus	Moderate	Wave length,	No	2.27
40-50	84	Slight	3,130 ang-strom units	No	

It is generally believed that we may attribute the action of ultraviolet rays in rickets to the activation of the sterol in the tissues. If so, one can obtain exact information as to the specificity of various wavelengths by ascertaining the absorption band of the sterol, for it is one of the fundamental laws of light energy that radiations produce an effect only where they are absorbed. At the present time it would seem as if ergosterol is the substance which is acted on in the superficial tissues by the short ultraviolet rays. This is the conclusion which must be drawn from the recent work of Windaus and Hess [7] and Rosenheim and Webster [8] on the separation of ergosterol from cholesterol, although these investigations do not preclude the possibility that other sterols may be similarly activated. It is of interest, therefore, in connection with this study of monochromatic waves to find that ergosterol, or a sterol almost identical with it, according to a curve plotted by Heilbron and his associates,[9] has marked absorption bands at 293, 280 and 269 millimicrons (fig. 3). It is of greater significance from the standpoint of solar irradiation to note that its absorption of ultraviolet rays ceases rather abruptly at about 313 millimicrons; in other words, according to our tests, at the uppermost confines of the antirachitic zone.

CONCLUSIONS

Ultraviolet radiations shorter than those of sunlight are more potent in healing rickets than the effective area of solar rays—the band comprising waves from 290 to 313 millimicrons.

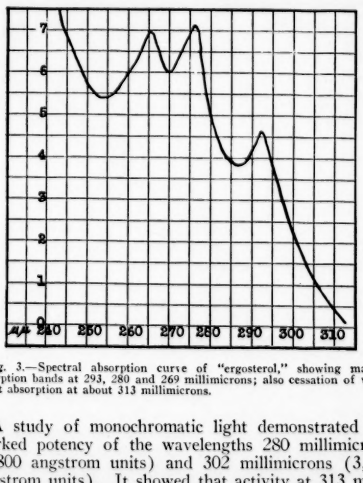

Fig. 3.—Spectral absorption curve of "ergosterol," showing marked absorption bands at 293, 280 and 269 millimicrons; also cessation of ultraviolet absorption at about 313 millimicrons.

A study of monochromatic light demonstrated the marked potency of the wavelengths 280 millimicrons (2,800 angstrom units) and 302 millimicrons (3,025 angstrom units). It showed that activity at 313 millimicrons (3,130 angstrom units) is very feeble and that this point must be regarded as the upper limit of the antirachitic field. The area of specific solar radia-

7. Windaus, A., and Hess, A. F.: Verhandl. Gesellsch. Wissensch. Göttingen, January, 1927, p. 175; Proc. Soc. Exper. Biol. & Med. **24**: 461, 1927.
8. Rosenheim, O., and Webster, T. A.: Lancet **1**: 306, 1926.
9. Heilbron, I. M.; Kamm, E. D., and Morton, A. R.: Bioch. J. **21**: 78, 1927.

tions is markedly circumscribed; a difference of a few millimicrons or millionths of a millimeter determines whether or not waves are effective. During the winter months when the shorter ultraviolet rays do not reach the earth and the longer ones are less intense, the width of the antirachitic zone of sunlight is only about 5 millimicrons. These observations emphasize the danger of the small band of specific radiations being filtered from the atmosphere by moisture, dust, smoke and other foreign substances.

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VOLVULUS OF THE CECUM AND ASCENDING COLON

REPORT OF THREE CASES *

J. P. PRATT, M.D., AND L. S. FALLIS, M.D.
DETROIT

Volvulus of the cecum and ascending colon is a relatively rare condition. Developmental variation of the intestine predisposes to it. Symptoms arising from this mechanical disturbance are fairly characteristic. The clinical picture most frequently described emphasizes the acute condition. Chronic manifestations may be less evident than the acute but they are of equal importance.

ETIOLOGY

Volvulus of the cecum occurs only in the presence of some form of defective development. Among the lesser degrees of developmental error is the persistence of the mesentery of the cecum and ascending colon, a condition which predisposes to volvulus and is essential to its production. The grosser developmental errors are not infrequently encountered at laparotomy in cases of acute volvulus of the cecum. A brief reference to the embryology of the alimentary canal is therefore desirable.

The primitive alimentary canal appears at the fifth week in the form of a tube, consisting of three main subdivisions, foregut, midgut and hindgut. These divisions are not arbitrarily chosen, but are based mainly on blood supply, each part of the tract having a separate and distinct arterial connection; viz., foregut, celiac axis; midgut, superior mesenteric artery; hindgut, inferior mesenteric artery. Physiologically the same subdivision holds good; viz., foregut, digestive; midgut, absorptive; hindgut, excretory. From the foregut, the stomach and duodenum down to the bile papilla are derived; from the midgut, the remainder of the small intestine, the cecum, the ascending colon, and the right half of the transverse colon; and from the hindgut, the remainder of the colon and the rectum.

The intestinal loop lies in the vertical plane and is suspended by a common dorsal mesentery. The midgut and the liver grow so rapidly that the abdominal cavity cannot contain them; the midgut is, therefore, herniated through the umbilicus into the umbilical cord in the form of a loop. On the caudal segment of this loop the cecal bud appears. Three stages of rotations are described, the first stage taking place while the loop is in the cord and occurring between the fifth and tenth weeks. As growth rapidly takes place, the enlarging liver carries the cephalic segment downward and to the right, while the caudal segment is forced upward and to the left; thus the loop comes to occupy the transverse plane. The upper, or cephalic, segment from which the small intestine is largely developed now lies to the right in the transverse plane, and the lower, or caudal, loop from which the cecum and colon are derived lies to the left. The second stage of rotation takes place during the tenth week, while the loop is being returned to the abdominal cavity. On account of its bulk the cecum is the last to enter; accordingly, the small intestine enters first and occupies the right half of the abdomen. The cecum and colon now enter and lie in the region of the umbilicus, occupying a position to the left of and on a plane anterior to the small intestine.

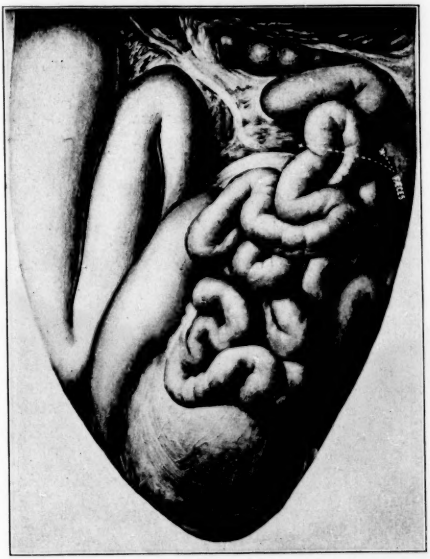

Fig. 1 (case 1).—Small intestine lying across the ascending colon, adding to the obstruction caused by torsion.

If development is arrested at this stage, the condition is known as nonrotation, and, as has been shown, the small intestine occupies the right half and the large intestine the left half of the abdomen. The ileum enters the cecum in the reversed direction; that is, from the right side. The mesentery of the cecum and ascending colon is attached along the left border of the vertebral column. What should be the hepatic flexure now lies behind the stomach. Between the hepatic and the splenic flexure, which is a fixed point, the transverse colon descends for a variable distance in the form of a U-shaped loop. This U-loop of the transverse colon, shown in figure 4, is a characteristic and well recognized feature of nonrotation. The descending and pelvic colons occupy their normal positions.

Following the return from the umbilical cord to the abdominal cavity, the colon straightens out, carrying the cecum upward, to the right and in front of the superior mesenteric vessels and small intestine, to occupy a

* From the Surgical Department of the Henry Ford Hospital.
* Read before the Section on Gastro-Enterology and Proctology at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 20, 1927.

position under the liver. The second stage of rotation is completed by elongation of the colon, thus forcing the cecum down into the right lower quadrant.

Various developmental errors occur during this period; the process may be arrested at any stage. After the cecum has come to occupy its position under the liver, it may become fixed there and no further descent takes place. Occasionally the cecum is arrested in the subpyloric region, preventing the adherence of the mesentery of the small intestine. The entire small intestine then hangs on a narrow pedicle formed by the duodenojejunal flexure and the terminal ileum. Should volvulus occur when development is arrested as this stage, the small intestine wraps itself around the cecum. This variety of intestinal obstruction is usually

Fig. 2 (case 1).—First step in reduction of the obstruction. The small bowel is removed from its position of pressure on the ascending colon. The colon is rotated 360 degrees.

found in infants a few days old. Another form occurs in which rotation is reversed and the large intestine passes behind the superior mesenteric vessels and the duodenum, the mesentery of the small intestine forming a tunnel through which the transverse colon passes. This arrangement may prove baffling, because at first sight the intestines appear to occupy their relative normal positions. Its possibility should be kept in mind during investigation of an otherwise unexplained intestinal obstruction.

The third stage of rotation takes place between the eleventh week and the fifth month, and is marked by the descent of the cecum and the ascending colon still retaining their mesentery. Completion of the third stage is brought by the fusion of the primitive mesenteries with the posterior parietal peritoneum. In this manner the duodenojejunal angle becomes a fixed point; likewise, does the root of the mesentery come to occupy its fixed position; thus the cecum, ascending colon and terminal ileum lose their mobility. Especially important is the persistence of the primitive mesentery of the ileocecal segment. The presence of a mesentery in this portion of the gastro-intestinal tract permits of many degrees of mobility, ranging from simple "cecum mobile" lying in the pelvis to an ileocecal segment, which may be found as remotely placed as the splenic flexure. All forms predispose to volvulus, which by no means develops in all cases of unduly mobile cecum. The chance for the occurrence of twisting is directly proportional to the length of the mesentery on which the cecum hangs. Aside from the developmental process, certain predisposing factors, such as age and sex, must be considered.

Cases have been reported at all ages, varying from 5 to 80 years. By far the majority of cases, however, occur during young adult life, the period of greatest bodily activity.

The condition occurs more commonly in males than in females. In an analysis of 150 cases, the ratio is 3 to 1, which may be explained by the fact that females are less exposed to violent muscular effort. This is of especial interest, since developmental variation occurs more frequently in females. Cases have been reported in which, during early pregnancy, the enlarging uterus pushed upward on a mobile cecum and produced a partial twist, torsion being rendered complete by abnormal peristalsis due to the vomiting of pregnancy. During the later months of pregnancy, the enlarged uterus as a rule fixes the mobile colon and acts as a deterring factor. Furthermore, after delivery the lax abdominal walls predispose to the condition.

It is generally recognized that overeating and dietetic indiscretion play a most important rôle in the production of this malady, especially when followed by exercise.

Individuals with a mobile cecum usually are troubled with constipation because of the mechanical disadvantage at which the cecum and ascending colon must work. Gaseous distention of the cecum is common, in fact, is a useful diagnostic point in the recognition of this condition in the chronic state. The distended cecum may move toward the midline and become kinked at its upper limit. A sudden movement, such as running, jumping, lifting a heavy weight or dancing, is made and torsion results. Abnormal peristaltic action set up by abuses of the digestive tract acts in a similar manner.

Öhman [1] believes that the character of the food is an important factor. During the late war, when famine was rife in the Baltic provinces of Russia, the peasants were obliged to adulterate their flour with coarse vegetable matter. With this practice, the occurrence of volvulus rose enormously, the explanation being that the undigested coarse vegetable fibers acted as an irritant to the colon and so set up abnormal peristalsis.

Strangulated hernia has been given as a cause of volvulus. When both conditions are present, the question arises as to which occurred first. The more plausible explanation seems to be that volvulus occurs first, and the distended coils are then forced down into the hernial sac.

Finally, there are cases which cannot be adequately explained by dietary indiscretion or sudden movements, the condition apparently coming on during sleep.

1. Öhman, Edvard: Contribution to the Knowledge on Volvulus of Cecum, Finska lak.-sallsk. Handl. **66**: 579-602 (July-Aug.) 1924.

Probably not more than 5 or 6 per cent of intestinal obstructions are due to volvulus of the cecum. It is much less common than volvulus of the sigmoid. The largest groups of cases reported are those of Öhman [1] (fifty-three cases); Corner and Sargent [2] (fifty-seven cases), and Chalfant [3] (119 cases), which include 110 cases of Bundschuh.[4] An individual surgeon seldom has an opportunity to see very many cases.

SYMPTOMS AND DIAGNOSIS

Symptoms may be acute, subacute or chronic. In general, they are the symptoms of intestinal obstruction, partial or complete. The preoperative diagnosis is usually intestinal obstruction, the final diagnosis of volvulus being made at operation or autopsy.

Acute symptoms, as nausea, vomiting, obstinate constipation—in spite of the use of cathartics and enemas—pain (usually spasmodic), tenderness and distention, suggest an intestinal obstruction. The temperature is usually not considerably changed until late. The pulse rate is not greatly increased until toxemia is quite marked. When the obstruction is quite evident, its localization may be suspected; for, as has often been stated, the progress of symptoms is slow in lower bowel obstruction and relatively rapid in the upper intestinal tract. This is particularly true of vomiting. Öhman [1] has demonstrated that the capacity of the bowel below the obstruction is a means of determining the site. In volvulus of the sigmoid the lower bowel will not hold more than a liter, but if the cecum is involved the amount may be increased to 2 or 3 liters. The relative increase in distention is also suggestive. Homans [5] has observed that gas forms in the obstructed cecum much more rapidly than in other portions of the bowel.

Chronic symptoms are not so characteristic, and they merit further study in the hope of facilitating earlier diagnosis. Frequently in the history there is obtained a long story of "indigestion" and "repeated attacks" of abdominal discomfort, which may be interpreted as being the symptoms of a chronic or subacute obstruction just preceding the acute attack; thus it seems that the symptoms which brought the patient to operation differ only in degree from those of the previous attacks. A study of our first two cases prompted an earlier diagnosis of the third.

PATHOLOGY

Pathologic changes found at operation or autopsy vary from simple torsion to complete gangrene of the bowel. The basis for these changes is the obstruction of the bowel lumen and the disturbance of the circulation. It is generally believed that if the rotation is not greater than 180 degrees the circulation will not be disturbed. The direction of rotation is most frequently clockwise. The manner of fixation of the mesentery of the ileum has been assigned as the cause of this.

The amount of change in the bowel increases with the amount of rotation, as well as with the length of time the volvulus has existed. In case 1, the rotation was 360 degrees. There was complete obstruction of the bowel and at the same time interference with the circulation. As a result, gangrene of the bowel occurred. In case 3, only defective development with torsion was found at operation. From the previous history it may be assumed that there had been recurring attacks of partial obstruction.

CASE 1.—A. G., a man, aged 28, previous to the onset of the present illness had usually been well and strong, with a good appetite and no indigestion, although he had always had slight constipation. He thought that he had had some jaundice six months before.

Two days after Christmas and nine days before he came to the hospital, the illness began with chills, and aching pain over the right part of the abdomen, which later became cramplike. There were no bowel movements for six days, during which time there was nausea and vomiting.

Examination revealed that the abdomen was distended and tender throughout; and the patient continued to complain of

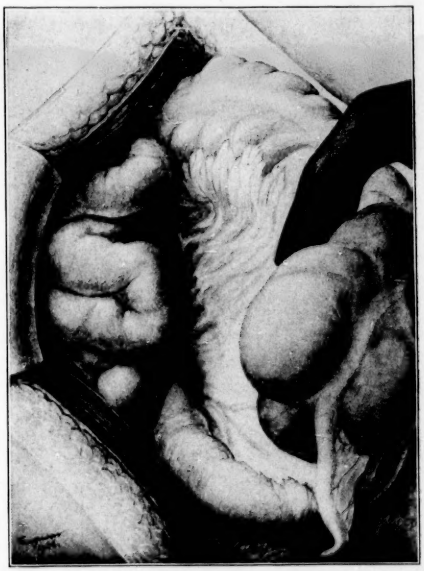

Fig. 3 (case 3).—The ileum entering the cecum from the right; the small bowel is all on the right side of the abdomen.

cramplike pain all over the abdomen. He was more comfortable with his legs drawn up to relieve the abdominal tension. He appeared to be generally toxic. The muscles of the abdominal wall were not rigid. The temperature on admission was 99; the pulse, 78; the respiration, 20; the white blood count, 5,600; the chlorides, 350; the nonprotein nitrogen, 42.2, and the blood sugar, 83. A diagnosis of intestinal obstruction was made.

At operation through a right rectus incision, the abdominal contents were found normal, except for the colon and ileum. The cecum and ascending colon with the terminal portion of the ileum was rotated 360 degrees clockwise on its long axis. Further, it was found that in addition to the rotation on the long axis the cecum had come to lie in the left side of the abdomen. Associated with the rotation of the bowel on its long axis, the ileum had passed upward to the right of the ascending colon and crossed over it, near the hepatic flexure, and then downward on the medial side, thus compressing it. This was obviously sufficient to disturb the circulation of the cecum considerably. The bowel was discolored almost

2. Corner, E. M., and Sargent, P. W. G.: Volvulus of the Cecum, Ann. Surg. **41**: 63-75, 1905.
3. Chalfant, S. A.: Torsion of the Cecum with Review of the Literature and Report of a Case, Am. J. Obst. & Gynec. **2**: 597-600 (Dec.) 1921.
4. Bundschuh, E.: Ueber Volvulus des Dickdarmes, Beitr. z. klin. Chir. **85**: 58-90, 1913.
5. Homans, cited by Bundschuh (footnote 4).

black, but on release of the obstruction the normal color slowly returned. It seemed that the circulation would be reestablished sufficiently to permit closure without drainage.

Detorsion was accomplished by first returning the loop of small bowel to the right of the cecum and ascending colon, and then downward to the pelvis, allowing the colon to return to its normal position on the right side.

The patient died two days after the operation. Autopsy showed that death resulted from perforation of the colon at the point of greatest pressure. During the operation the continued improvement of the obstructed bowel led to the belief that the patient was going to recover completely. This proved to be an error in judgment, as there was one area in which the circulation had been too greatly disturbed. At this point gangrene with perforation occurred. In this case the defective

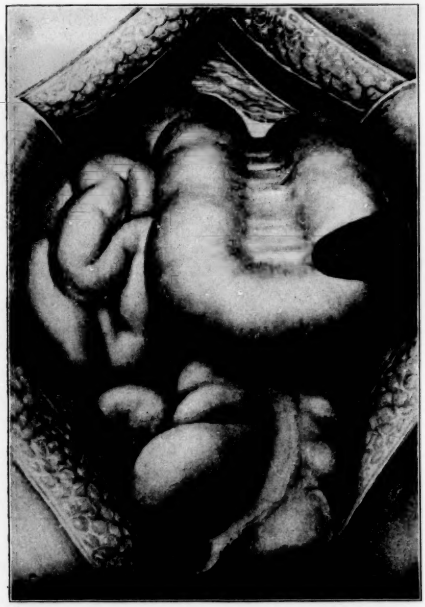

Fig. 4 (case 3).—The peculiar U shaped loop of the transverse colon, which is characteristic of the maldevelopment in which the large bowel remains on the left side of the abdomen.

anatomic developments leading to the volvulus were hyperdescent of the cecum and a long mesentery to the cecum and ascending colon. This was accompanied by a change in the relations of the duodenum.

CASE 2.—R. F. S., a man, aged 25, had had pain in the abdomen for two days. The past history was of no great consequence, except in reference to the gastro-intestinal tract. He had had occasional slight attacks of distress after eating; his appetite had always been good but he was constantly underweight.

The patient was tall and weighed 135 pounds (61 Kg.). He had had some constipation and a sense of bloating in the stomach. The acute attack which induced the patient to seek relief began about thirty-two hours prior to admission. There were several things noted by the patient to which he attributed his present illness. A week before admission he had had a sore throat, accompanied by fever and general malaise. This improved somewhat, and three days before admission he ate very heartily (Thanksgiving dinner). He stressed particularly the eating of a large quantity of canned loganberries. The attack began with aching pain in the center of the abdomen, the pain from its onset being continuous in character without radiation. Vomiting started shortly after the onset of pain and persisted. The patient took salts, which resulted shortly in a soft bowel movement. This was just at the onset of the trouble. There were no bowel movements afterward.

The patient appeared undernourished and quite ill. The temperature was 99; the pulse, 114; the white blood count, 29,500, with 91 per cent polymorphonuclears. The abdomen was quite distended, yet not rigid and tympanitic; tenderness was diffuse. A preoperative diagnosis of volvulus was made.

At operation, detorsion of the volvulus of the cecum and ascending colon, was found. There was some free fluid in the abdominal cavity. The left half of the colon was collapsed. The cecum was greatly distended with gas, and likewise to a lesser degree the small bowel was disturbed. The torsion was clockwise 180 degrees. In addition to the torsion of the ascending colon there existed a displacement somewhat to the left, and, furthermore, the small bowel had looped over the ascending colon. Detorsion was accomplished by returning the small bowel first to the right side of the abdomen and then, by way of the pelvis, to the left side, and by replacing the ascending colon and cecum in its normal position. On account of distention of the bowel wall with subsequent thinning out, nothing further was done at the time than a detorsion.

Convalescence was uneventful. The patient was advised to have the bowel fixed, so that there would not be a further recurrence of the volvulus. He was observed for a period of three months, at the end of which time he returned for further operation. It was then found that there was great redundance of the cecum and a complete mesentery, which permitted the entire right colon to be brought out of the abdomen. A cecopexy was done, thus fixing the cecum and ascending colon in the normal position. Following this, the patient improved greatly and has remained in perfect health. When seen eight months after the operation, he had gained 20 pounds (9 Kg.), and was feeling better than he had for years. There was no further abdominal discomfort.

CASE 3.—C. G., a man, aged 30, a Maltese, complained on admission of pain after meals in the left epigastrium under the left costal margin, which had been present more than two years. For about two and a half years pain had been noted in the epigastrium coming on at irregular intervals after meals, usually about from a half hour to three hours later. Sometimes the pain was aggravated by eating. Sometimes it was sufficient to waken him. His appetite was poor and he was afraid to eat. He had been troubled with constipation for several years. Nausea and vomiting occurred in the morning, and he was afraid to eat breakfast on this account. There had been no outstanding acute abdominal attack, and he had not been accustomed to taking cathartics.

For the past two years there had been intervals during which the patient felt well for a short time, but for the past one and a half months the symptoms of pain, tenderness, nausea and vomiting had been aggravated, and the constipation was becoming increasingly worse.

The patient's weight was about normal, and the general physical examination was negative. There was definite tenderness in the epigastrium and along the left side of the abdomen. There was very slight abdominal distention, most of which was relieved by the use of enemas. The spleen was found to be somewhat enlarged. The urine and stool examinations were negative. Differential blood count showed 15 per cent eosinophils. The enlarged spleen, together with a long history of intestinal disturbance, were naturally suggestive of parasitic infection. However, evidence of this was not found on careful examination of the excreta. Roentgen-ray examination showed the large bowel to be entirely on the left side of the abdomen. The cecum was very redundant and mobile.

The preoperative diagnosis was defective formation of the intestinal tract with recurring attacks of partial volvulus.

Operation confirmed the roentgen-ray observations. All the large bowel was on the left side and all the small bowel on the right side of the abdomen, and there was a short mesentery binding the loops of the transverse colon into a narrow U,

the base of the loop dipping down to the pelvis (fig. 4). The cecum and ascending colon were very mobile but did not show torsion at the time of operation. The ileum entered the cecum from the right. The duodenum pointed directly downward to the right, not dipping under the mesentery as normally would be expected.

To prevent further volvulus and to relieve the symptoms of stasis in the large bowel, a cecopexy was done, the medial and lateral longitudinal bands being brought together with interrupted sutures of catgut and the same sutures being used to fix the cecum and ascending colon to the anterior abdominal wall at the point of closure of the incision. This fixation was carried farther up toward the round ligament of the liver, so that the upper portion of the abdomen was thus completely divided by an anteroposterior septum. This was intended to make it impossible for the small bowel again to

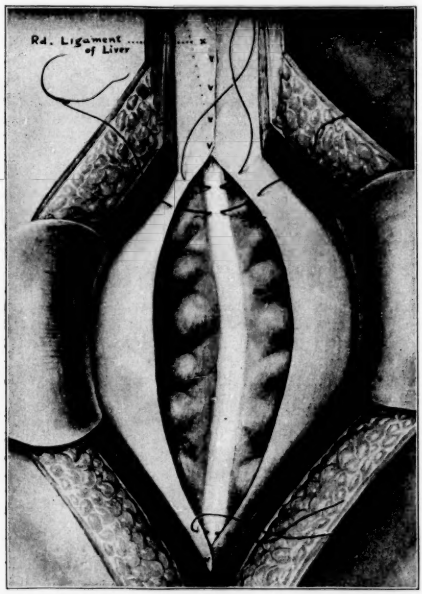

Fig. 5 (case 3).—Method of fixation of the ascending colon to the anterior abdominal wall, to prevent any future possibility of the small bowel crossing the ascending colon.

cross over the cecum, thus preventing any recurrence of partial volvulus and obstruction. Convalescence was satisfactory. The abdominal discomfort disappeared.

TREATMENT

The operative treatment for relief of the symptoms produced by volvulus of the cecum includes detorsion, cecostomy, resection and release of constricting bands with or without an attempt to correct the defective development. Choice of operation must depend on the general condition of the patient as well as on the type of defective development. The ability and experience of the individual operator must also enter into the decision whether one or more of these methods of operation shall be employed. It is better to save the life of the patient by the simplest operation possible, and by a second stage attempt to correct the defective development and thereby prevent a recurrence. If the patient's general condition permits, a cecostomy serves a double purpose: first, relief of the obstruction, and, second, fixation. Figure 5 illustrates a special procedure which seemed indicated in this particular type of arrested development to prevent further recurrence of obstruction.

Much can be accomplished by an earlier diagnosis. This includes the recognition of disturbed development as a cause of recurring attacks of abdominal discomfort. It is a striking fact that while developmental error occurs more frequently in women than in men, volvulus with severe obstructive symptoms is more common in men. The inference is that there may be one or more exciting causes. There is considerable evidence that extremes in diet and physical exertion should be seriously considered as important factors when development of the intestinal tract is abnormal.

The mortality of volvulus of the cecum is around 50 per cent. Earlier diagnosis and treatment should materially reduce this percentage.

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ABSTRACT OF DISCUSSION

DR. V. S. COUNSELLER, Rochester, Minn.: This subject is interesting because volvulus of the cecum and ascending colon is the result of a congenital abnormality; for this reason the volvulus is usually most difficult to treat. As Dr. Pratt has said, the volvulus is caused by a congenitally long mesentery to the cecum, produced by the abnormal rotation of the cecum from left to right. Normally, the cecum rotates up toward the transverse colon and then down to the right ileac region, and becomes fixed there. In about 87 per cent of all persons, the cecum is fixed at this point; in the other 13 per cent, the cecum is mobile because it has not become fixed at this point. The long mesentery, and the fixed point, which is usually in the transverse colon, more to the right than to the middle, constitute the conditions necessary for volvulus of the cecum. This volvulus always occurs clockwise and never counterclockwise. It can be, as Dr. Pratt has stated, acute or chronic. In many cases, as exemplified by his third case, symptoms of chronic intestinal obstruction are in all probability due to the rotation of the cecum. In this type of case the pathologic changes caused by the rotation may be extreme. As Dr. Pratt has said, these sometimes occur in the late stage. The pathologic changes begin when the rotation reaches 180 degrees. Then strangulation of the blood vessels occurs, and beginning occlusion of the lumen of the bowel. This constitutes intestinal obstruction, one of the greatest hazards in surgery and one that calls for all the ingenuity a surgeon possesses if the operation is to be brought to a successful termination. The general condition of the patient presents grave difficulties, for he is profoundly ill. The more restricted the scope of the operation, the better the patient will survive it. As Dr. Pratt has stated, a two-stage operation would perhaps be best. If gangrene from strangulation is found at operation, it is best to deliver both the gangrenous and the adjacent intact portions of the bowel, cut between clamps and put a tube in each end with drainage to the surface. The ileum must be drained because that is where the toxic substance is that is producing the toxicity. Dr. Pratt made that point very definitely. I saw a woman, aged 80, on whom a colleague of mine operated, with strangulation from an inguinal hernia in which the cecum and the lower portion of the ileum were drawn down and strangulated. The surgical risk was very serious. After delivery of both ends, and excision between clamps, a tube was inserted, the operation really constituting ileostomy. The patient made an uneventful recovery, and she has felt so well since that she does not feel like having the stoma closed; this is fortunate, because of the difficulty of closing an ileum. However, she is 80 and is well, and that is the chief point in all these cases of obstruction. If the patient is alive, one can do a secondary operation, as Dr. Pratt has suggested.

DR. J. P. PRATT, Detroit: The importance of an early diagnosis of intestinal obstruction should be emphasized. Too frequently, active treatment is unnecessarily delayed. One of our patients had been ill nine days before he sought the attention of a physician. In another instance, the physician waited three days after symptoms of obstruction appeared. If we could get these patients earlier, the percentage of cures would be greatly increased.

DEAD (PRESERVED) FASCIA GRAFTS FOR HERNIA REPAIR

CLINICAL RESULTS *

AMOS R. KOONTZ, M.D.
BALTIMORE

A little more than a year ago I published the results of a series of experiments on the use of dead fascia grafts for hernia repair.[1] I here report the application to human beings of the principles established in animals. Before doing this it might be well to discuss again briefly just what is meant by dead grafts.

The attention of the medical world was first directed toward the subject of dead grafts in 1917 by the French worker Nageotte,[2] who transplanted pieces of alcohol-preserved tendon to repair anatomic defects in the tendons of living animals. He found that the graft of dead tendon "took" just as well as grafts of living tendon, and on subsequent microscopic studies of the implanted dead graft he found that the histologic changes which took place were as follows: The dead cells of the graft were removed by the wandering cells of the host; fibroblasts from the host grew into the persisting connective tissue framework of the graft, and repopulated this framework with living cells in the place of the old dead inhabitants; and, finally, a new circulation was established in the graft, so that in a short while it was impossible to tell that the graft had ever been dead. The theoretical considerations which formed the basis for Nageotte's work were his assumptions that the fibers of the connective tissues are inert coagula formed from living cells and that, hence, their preservation in alcohol does not change their physical or chemical character in the slightest, as they are, in fact, dead substances in the animal just as they are in the alcohol. If this is true, one would not then expect, when these tissues are implanted among living tissues, that they should act as foreign bodies and produce a foreign body reaction, phagocytosis, or show a tendency to be absorbed. They are simply inert fibers implanted among their fellows of the same kind.

Nageotte's results had been foreshadowed by the work of two other Frenchmen, Bonnefon and Lacoste,[3] who published the results of extensive researches on living corneal grafts in 1912 and for several succeeding years. Bonnefon and Lacoste's researches and the histologic study of their preparations led them to oppose the hypothesis of the integral survival of grafts. They found that when a living corneal graft was implanted, the cells of the graft invariably died and were replaced by living cells from the host. The fibrous framework of the graft, however, remained intact, and became attached to the graft carrier by the ingrowth of fibroblasts from the host.

Similar views with regard to corneal grafts had been previously expressed by such workers as Ribbert,[4] Marchand [5] and Salzer.[6]

Analogous views were expressed in 1911 by Villard, Tavernier and Perrin [7] concerning grafts preserved in the icebox. They expressed the view that blood vessels preserved for a long time in the icebox do not live really, but that one grafts only their connective tissue skeleton, which becomes invaded by cellular elements from the host that furnish it with a vitality sufficient to assure the continuity of the vessel on which it is implanted.

Nageotte has made some interesting observations contrasting the events that take place after the implantation of living and dead tendon grafts. In the case of the living grafts, he states that three distinct phenomena occur: (1) the texture of the tissue becomes attached to that of the host by the ingrowth of fibroblasts; (2) a new vascular network is installed, and (3) the cells, for a moment altered, are rehabilitated in their former integrity. If a piece of dead tendon is inserted, what are the modifications of the process? The first two phenomena occur just as before. Only the third phenomenon shows a variation: the dead cells are carried away, and are replaced by living cells from the host. The final results are identical. Are there not, then, all possible intermediaries between living and dead grafts? If a majority of the cells of the living grafts kept in the icebox are dead, are not at least some cells of living grafts that are removed and immediately transplanted also dead? Apparently, the fibrous framework is the constant and unvarying structure of connective tissue grafts, inert in all instances, and the cells are the variable factor that determines whether the graft is alive or dead. For all practical purposes, it makes no difference whether they are alive or dead.

The experimental work of Nageotte has been confirmed by a number of French and a few German workers.[8] The principles have been applied clinically by several French surgeons,[8] who have used grafts of dead tendons taken from animals to repair anatomic defects in the tendons of human beings, principally soldiers suffering from war wounds. A case in point is that of Christophe,[9] who successfully grafted an entire patella, with its quadriceps and patellar tendons, that had been preserved in 80 per cent alcohol for three days, into the knee of a soldier who had lost his patella from a gunshot wound four months before. The grafted patella was obtained from another soldier who died from a head injury. The functional result was excellent, and a roentgenogram made four years after operation showed a normal knee.

On reading the accounts of the work of these French investigators, it occurred to me that, if dead tendon grafts could be used, dead fascia grafts were also a possibility, and that they might be of value in the repair

* From the Surgery Department of the Johns Hopkins Hospital and University.
* Read before the Section on Surgery, General and Abdominal, at the Seventy-Eighth Annual Session of the American Medical Association, Washington, D. C., May 20, 1927.

1. Koontz, A. R.: Experimental Results in the Use of Dead Fascia Grafts for Hernia Repair, Ann. Surg. **83:** 523-536 (April) 1926.
2. Nageotte, J.: Sur la greffe des tissus morts et en particulier sur la réparation des pertes de substance des nerfs a l'aide de greffons nerveux conservés dans l'alcool, Compt. rend. Soc. de biol. **80:** 459-470, 1917. Other references are given by Koontz (footnote 1).
3. Bonnefon, G., and Lacoste, A.: Recherches sur le régénération transparents du tissu cornéen normal du lapin, Compt. rend. Soc. de biol. **2:** 145-146, 1912. Other references are given by Koontz (footnote 1).
4. Ribbert, quoted by Bonnefon and Lacoste.
5. Marchand, quoted by Bonnefon and Lacoste.
6. Salzer: Ueber Implantation konservierter Pferdehornhaut in die Kornea des Kaninchens, München med. Wchnschr. **58:** 1423-1425, 1909.
7. Villard, E.: Tavernier, L., and Perrin, E.: Recherches expérimentales sur les greffes vasculaires, Lyon chir., August, 1911, cited by Nageotte.
8. References cited by Koontz (footnote 1).
9. Christophe, L.: Recherches sur les greffes d'os fixé à l'alcool et sur le mécanisme de l'ostéogénèse, Arch. franco-belges de chir. **26:** 13-56 (Jan.) 1923.

of large ventral hernias, in which it was difficult to find enough fascia left surrounding the defect to make the repair. Several years ago, I therefore started a series of experiments with a view to determining whether this could be done. I first set out to see whether dead fascia transplants behaved in the same way as Nageotte's grafts of dead tendon. Cats and dogs were used for the experimental work. Fascia of various origins was preserved in 70 per cent alcohol for varying periods of time, and then implanted among the connective tissues of these animals. Among the various materials used were the fascia lata and sheath of the rectus of dogs and cats; the fascia lata and pericardial sac of the ox, and the submucous coat of the pig's bladder. These tissues were at first used to repair defects that had been made in the sheath of the rectus and fascia lata of cats and dogs. Histologic study of the specimens removed at various intervals following operation showed that the same thing happened in the case of these dead fascia grafts as had happened in the case of Nageotte's grafts of dead tendon. The dead cells of the grafts had been replaced by living cells from the host, the graft had become firmly fixed to the surrounding tissues by the ingrowth of fibroblasts, and the implanted tissue had become vascularized. Indeed, it would have been impossible to tell where the limits of the grafts were, had it not been for the landmarks of the black silk which had been used as suture material. This was true, both grossly and microscopically.

Having then determined what the behavior of dead fascia grafts could be counted on to be, I next set out to see whether they could be relied on to cure ventral hernias. Large ventral hernias were produced in dogs, and later repaired by suturing over the defect large sheets of dead fascia. Several of the materials mentioned were used, but it was found that the fascia lata of the ox gave the best results. The hernias were cured, and on subsequent examination it would have been impossible to determine the limits of the dead graft but for the row of black silk sutures used as suture material (fig. 1).

I then became interested in the application of this principle to the repair of inguinal hernias. Inguinal hernias have been much discussed in recent years. Seelig and Chouke,[10] in 1923, published the results of experimental work which tended to show that muscle would not grow to fascia, and that therefore the usual operation for inguinal hernia was entirely wrong. They had sutured the fascia lata of dogs to the underlying muscle, and obtained as a result only a delicate filmy type of union. On the publication of their report, I started a series of experiments[11] to determine whether their work could be confirmed. Investigation showed that in the dog there is a layer of areolar tissue between the fascia lata and the underlying muscle. If the fascia lata is sutured to the underlying muscle without the removal of this layer of areolar tissue, the type of union obtained is that described by Seelig and Chouke. If, however, this layer of areolar tissue is first carefully removed, firm union is obtained between the muscle and the fascia. I then tried suturing the internal oblique muscle to Poupart's ligament in the dog, where likewise firm union was obtained, but the more carefully the areolar tissue was first removed from the two structures the firmer was the union. (Gallie and LeMesurier[12] had previously shown that, in suturing together various fibrous structures, the intervening areolar tissue must be removed if firm union was to be expected.) I also found that a much firmer union still was obtained, if, before suturing, a narrow strip of the edge of the internal oblique muscle was resected, thus bringing a raw surface into contact with Poupart's ligament. Microscopic sections showed that the union of muscle to fascia was a union of the fibrous components of the muscle with the sheet of fascia, and, therefore, was in reality a fascia to fascia union. Naturally, then, the more intimately these fascial elements are brought into contact, the firmer will be the union.

The work of McArthur, published in 1901[13] and in 1904,[14] and of Gallie and LeMesurier[15] during recent

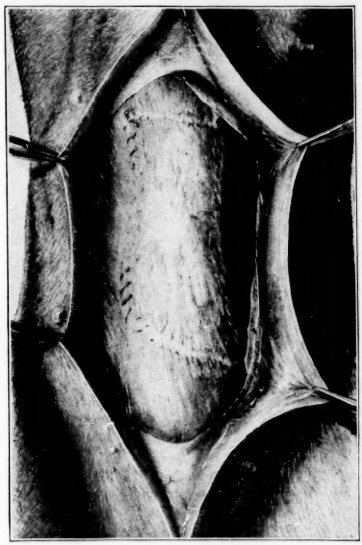

Fig. 1.—Repair of large ventral hernia in a dog with a piece of alcohol-preserved fascia lata of an ox; five months after operation.

years, on the use of the living suture in hernia repair, has a definite bearing here. Their use of living strips of external oblique aponeurosis (McArthur) and of fascia lata (Gallie and LeMesurier) is a still further step in the matter of bringing the fascial elements into intimate contact in the suture of the internal oblique muscle to Poupart's ligament. The report by Gallie and LeMesurier[16] of fifty cases of recurrent inguinal hernia in which operation was performed by this method, without recurrence over a period of three

10. Seelig, M. G., and Chouke, K. S.: A Fundamental Factor in the Recurrence of Inguinal Hernia, Arch. Surg. **7**: 553-572 (Nov.) 1923.

11. Koontz, A. R.: Muscle and Fascia Suture with Relation to Hernia Repair, Surg. Gynec. Obst. **42**: 222-277 (Feb.) 1926.

12. Gallie, W. E., and LeMesurier, A. B.: The Use of Living Sutures in Operative Surgery, Canad. M. A. J. **11**: 504-513 (July) 1921.

13. McArthur, L. L.: Autoplastic Suture in Hernia, and Other Diastases: Preliminary Report, J. A. M. A. **37**: 1162-1164 (Nov. 2) 1901.

14. McArthur, L. L.: Autoplastic Sutures in Hernia, and Other Diastases: Final Report, J. A. M. A. **43**: 1039-1043 (Oct. 8) 1904.

15. Gallie, W. E., and LeMesurier, A. B.: The Transplantation of the Fibrous Tissues in the Repair of Anatomical Defects, Brit. J. Surg. **12**: 289-320 (Oct.) 1924.

16. Gallie, W. E., and LeMesurier, A. B.: A Clinical and Experimental Study of the Free Transplantation of Fascia and Tendon, J. Bone & Joint Surg. **4**: 600-612 (July) 1922.

years, is a report of far better results than those obtained by any other surgeons using the old methods.

One great drawback to the operation of Gallie and LeMesurier is the fact that an additional operation has to be done in order to get their suture material. It occurred to me that it would be a great saving of time and labor if alcohol-preserved strips of fascia lata could be used in the place of their living sutures. I therefore sutured the internal oblique muscle to Poupart's ligament in dogs, using alcohol-preserved strips of fascia lata of the ox as suture material. The union obtained was a much firmer and more intimate union than that obtained by the other methods described in the foregoing.

AUTHOR'S OPERATIONS

I have now operated on seventeen hernias in the human being, using alcohol-preserved strips of fascia lata of the ox as suture material and employing the technic advocated by Gallie and LeMesurier for their "living sutures," except that I used linen instead of catgut for transfixion sutures to prevent splitting at the ends of the fascia strips, and anchored the ends of the strips when the suture line was finished with linen, instead of tying with the split end of the fascia strip. Nine of these patients had ordinary, uncomplicated, indirect inguinal hernias. The others were of the following varieties: two recurrent inguinal hernias, one of which had been operated on five times before; one strangulated indirect inguinal hernia; one recurrent and strangulated inguinal hernia; two direct inguinal hernias; one ventral hernia, and one postoperative hernia. Six of these patients have now been well for thirteen months, and the others for shorter periods of time, with one exception: a woman with a large postoperative ventral hernia, which came out just above and to the left of the symphysis pubis and hung down one third of the way to her knees, completely hiding the genitalia. This patient soon developed a small recurrence for the very good reason that it was impossible to make a strong closure of the lower end of the defect because of its being bordered by bone, and that an infection developed which was occasioned by the use of infected suture material.

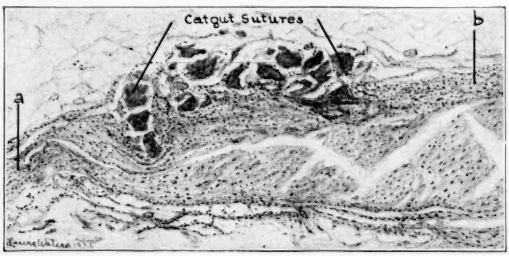

Fig. 2.—Microscopic drawing showing union of dead and living fascia, four months after operation: *a*, living fascia of host; *b*, dead graft.

In one case of indirect inguinal hernia, the method was given a severe test immediately following operation. The patient was an ignorant foreign laborer, with very heavy muscles and fascia. He could not void in bed and found catheterization so disagreeable that from the second day after his operation, until he was formally allowed out of bed, he invariably slipped out of the bed, when the nurse was not watching, and went to the lavatory to void. When remonstrated with, he insisted that he felt all right, and that it would not hurt him. Apparently it did not, as he obtained an excellent result.

A case that deserves special mention was that of a recurrent inguinal hernia that had become strangulated. At operation it was found that the sac was protuding between the taut fibers of Poupart's ligament, which held it so firmly fixed that it was necessary to cut the ligament in order to reduce the strangulation. It was impossible to suture the ligament, as the suture material slipped out between the longitudinal fibers of the ligament. Therefore, a basket weave was effected with strips of dead fascia, starting at the conjoined tendon, going through Gimbernat's ligament, the pectineus fascia and across the vessels to the fascia on the anterior surface of the thigh, and then back to the internal oblique muscle, thus making a buttress which effectually replaced the lacking bulwark of Poupart's ligament. It is now eleven months since this patient was operated on; the abdominal wall is perfectly solid and there is not the slightest evidence of recurrence.

The most interesting case of the series was that of a man, aged 70, who had been operated on five times before for a left inguinal hernia. He was referred to me by the surgeon who had operated on him the fifth time, who felt that the hernia could not be cured by the usual methods. This patient had a scrotal hernia, about the size of a coconut, which could not be reduced when he was examined at my office. At operation, an enormous amount of dense scar tissue was encountered, but the different layers were dissected out as well as possible. The sac contained several loops of intestine, which were adherent to its wall. The neck of the sac was 3 inches in diameter. After the sac had been dissected free and excised, the peritoneal opening was closed with a running suture of fine black silk. The hernia was then repaired in the manner described. Although it has now been only eight months since operation, the abdominal wall is perfectly firm at the site of operation, and there is no impulse on coughing, or other evidence of recurrence.

The cord was transplanted in all cases of inguinal hernia. The aponeurosis of the external oblique was overlapped, and sutured with interrupted sutures of black silk in all cases.

Healing by first intention was obtained in all the cases except two. In both of these infections developed, which were subsequently shown to be due to the presence, in the strips of fascia used, of nonpathogenic spores that had not been killed by the alcohol. One case was that of the large postoperative ventral hernia already mentioned; the other was that of a recurrent inguinal hernia. The patient lived in West Virginia and was sent home with two sinuses still draining. He came back seven months later with the sinuses still draining but without a recurrence of the hernia. When the sinuses were curetted, a silk stitch was found in one and a linen stitch in the other. Following the removal of these the sinuses promptly healed.

In neither of the infected cases was very much of the fascia discharged. Only a few small pieces, a few millimeters square, came out. This, and the fact that

cure was not prevented in the case of the recurrent inguinal hernia, would seem to indicate that the method is at least not more unfavorably influenced by infection than by other methods of hernia cure.

Several surgeons in different parts of the country have written me that they have used alcohol-preserved strips of fascia in hernia repair with excellent results. There are indications that its use will become more widespread as soon as it can be put on the market in convenient form.

OTHER SUGGESTED USES FOR DEAD FASCIA GRAFTS

The experimental and clinical results with grafts of dead fascia justify the belief that this material has a wider use in surgery than simply the repair of hernias. Why could it not be used in the operation for strengthening the capsule of relaxed joints, as in the case of habitual dislocation of the shoulder? Preserved tendons or strips of fascia could probably be substituted for the living tissues used by Gallie and LeMesurier [15] in their operation for recurrent dislocation of the patella. I do not see any reason why a tube of dead fascia should not be used in bridging tendon defects. Could not preserved strips of fascia lata be used in the operative cure of aneurysm, instead of the living strips used for this purpose independently by Nassetti [17] and Halsted [18] in 1912? Dr. Campbell [19] of Atlanta has recently reported four successful operations by the use of their method.

PREPARATION OF FASCIA

As it is not practical to obtain fascia in abattoirs aseptically, dependence has to be placed on the chemical sterilization of the material. As alcohol alone will not kill spores, something must be added which will do this and at the same time not change the chemical nature of the collagen fibrils, or make them irritating to the tissues. Johnson and Johnson of New Brunswick, N. J., are now working with me on this problem, and as soon as it is satisfactorily solved they will place the material on the market.

NEEDLES

In my first operations I used the needle devised by Gallie, which has a large eye to enable the threading of the strips of fascia, and also a large curve. It was found that with this needle it was often difficult to utilize the small ends of fascia. Therefore, I got the Murray-Baumgartner Surgical Instrument Company of Baltimore to make a modification of this needle, which has a much shorter curve, but retains the large eye, and is just as strong as the Gallie needle (fig. 3).

COMMENT ON USE OF FASCIA

Surprise has often been expressed that a dead tissue should remain for months or years unaltered among the tissues of a living organism. It seems to me that this surprise is due to a lack of the proper understanding of the true nature of the collagen fibers that make up the bulk of fascia transplants. These fibers are neither living nor dead in the ordinary sense of the word. They are merely inert bodies that form a part of a living organism. Their character is just the same when they are an integral part of a living animal as it is after they have been removed from that animal and preserved in alcohol. They are just as "dead" in the animal as in the alcohol. The physical and chemical character of the fibers has not changed in the least by preservation in alcohol. This is in marked contrast to what happens when true living protoplasm is placed in alcohol. The dead cells, that is, the dead protoplasm, of the alcohol-preserved fascia graft are removed by the wandering cells of the host when the graft is implanted, because they are dead extraneous matter. The fibers of the graft are left intact because they have the same physical and chemical character as like fibers of the host. They may both be called "dead" or both be called "alive" as suits one's fancy. The important thing is that they are alike both in form and in composition, and hence there is not the slightest reason why the fibers of the graft should arouse an antagonistic action on the part of the host.

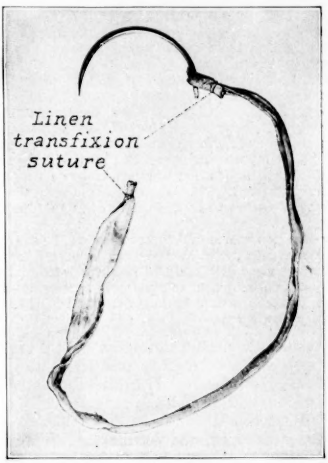

Fig. 3.—Needle used by author threaded with a strip of alcohol-preserved fascia lata of ox.

What is really needed as a basis for a more thorough understanding of the nature of the phenomena here described is a more ready familiarity with the characteristics of living tissues. This can be obtained only by long hours of observing fresh living tissues under the microscope. Can any one who has the knowledge gained from such hours of observation doubt the inert ("dead") nature of connective tissue fibers?

The point has been raised that chromicized catgut, chromicized kangaroo tendon and the chromicized submucous coat of pig's bladder used by Baer [20] in arthroplasties are all absorbed in course of time, and it is asked why alcohol-preserved fascia grafts are not likewise absorbed. Doubtless the chemicals with which these materials are treated have something to do with their absorption. Besides, in the case of catgut and kangaroo tendon, the strands are generally so twisted

17. Nassetti F.: Avvalgimento di vasi sanguigni con lembi di aponeurosi, Atti della R. Acad. dei Fisiocritici in Siena, April 26, 1912, quoted by Halsted.

18. Halsted, W. S.: The Effect of Ligation of the Common Iliac Artery on the Circulation and Function of the Lower Extremity. Report of a Cure of Iliofemoral Aneurysm by the Application of an Aluminum Band to that Vessel, Bull. Johns Hopkins Hosp. **23:** 217 (July) 1912, footnote; Partial Occlusion of the Thoracic and Abdominal Aortas by Bands of Fresh Aorta and of Fascia Lata, Ann. Surg. **68:** 183-187, 1913.

19. Campbell, J. L.: Fascial Bands in the Treatment of Aneurysm, South M. J. **19:** 795-798 (Nov.) 1926.

20. Baer, W. S.: The Use of Animal Membrane in Producing Mobility in Ankylosed Joints, Bull. Johns Hopkins Hosp. **20:** 271-274 (Sept.) 1909.

and hardened that it would be impossible for fibroblasts from surrounding tissues to grow into them even if no complicating chemical questions were involved.

Furthermore, it was demonstrated by Rehn [21] in 1910 and by Lewis and Davis [22] in 1911 that grafts of tendon and fascia behave quite differently when they are given a function to perform than when they are simply implanted into subcutaneous tissue. When given a function to perform, they do not show any tendency to be absorbed. When implanted into subcutaneous tissue they rapidly decrease in size, do not readily have the circulation reestablished, and become surrounded and more or less invaded by phagocytes and round cells.

Immediately after the publication of my first paper on this subject, Dr. J. M. Macdonald of Toronto wrote me, calling attention to remarks by Hutchinson [23] on the absorption of kangaroo tendon. Hutchinson says:

> We require sutures which are at the same time strong, not soon absorbed, and yet nonirritating to the tissues.
>
> In my opinion there is no material which answers these requirements so fully and so well as kangaroo tendon. In closing a large hernial aperture it may be desirable to use sutures of considerable thickness; in other cases this is not necessary. As may readily be proved, the tendon sutures are very strong, perfectly supple, and if all aseptic precautions are observed they become organized into fibrous tissue, blending with the tendinous structures, etc., in which they have been inserted. It is a common delusion, responsible partly for their comparative neglect in surgical practice, that tendon sutures are absorbed after a short time, in the same way as catgut. . . .
>
> As to the persistence of kangaroo tendon, I have now and then had the opportunity of examining sutures I had inserted two years or more previously. They were still to be recognized by their white color, microscopic sections showing them to have become normal fibrous tissue, part of the living structure of their host.

Apparently, then, Hutchinson has had the same experience with kangaroo tendons that Nageotte had with other preserved tendons. Hutchinson, however, neglects to mention the method of preparation of the tendon used by him.

In this connection, the comment of certain, much earlier writers on the fate of buried animal ligatures and sutures is most interesting. Dr. H. G. Jamieson,[24] professor of surgery in Washington Medical College of Baltimore, published as early as 1827 the results of experimental work on ligatures. He used flat buckskin ligatures, and states that twenty-five days after tying the left carotid of a dog there was found an actual adhesion of the leather to the coat of the artery. When the ligature was pulled away, one plainly saw a delicate membrane passing from the artery, and ending on the ligature in fringed extremities. Dr. Jamieson insisted on the ligature being flat, and stated that the practice of Dr. Physick of the University of Pennsylvania, who rolled his ligatures on a marble slab to make them round and hard, was "highly reprehensible."

Forty years after Jamieson's publication, Lister [25] began the publication of his experimental work on ligatures. Thirty days after the carotid artery of a calf had been tied with a peritoneal ligature, the ligature appeared to be still in place. On more careful inspection it was shown that the ligature had been transformed, by absorption and substitution, into a band of living tissue. In the center of this band of living tissue was found a remnant of the original ligature. Lister said:

> At a short distance from the remains of the old thread, the fleshy material which had been formed at its expense proved to be a most beautiful example of fibroplastic structure, the coarse fibers which mainly constituted it being composed of very large elongated cells, containing several nuclei, and presenting in their course branchings and thickenings of various forms. . . . Here and there were seen fibers more perfectly formed, and also cells of more rudimentary character. . . . It appears then that, by applying a ligature of animal tissue antiseptically upon an artery, whether tightly or gently, we virtually surround it with a ring of living tissue, and strengthen the vessel where we obstruct it.

Dr. Henry O. Marcy [26] of Boston, who had been a pupil of Lister's, reports the results of experimental studies on buried catgut sutures. Returning, in 1870, from his studies under Lister, he was soon furnished with an opportunity to apply Lister's principles of the application of the ligature in the form of the buried suture. In 1871, in operating on a strangulated hernia, he closed the large ring with deep catgut sutures, and got a permanent cure of the hernia. This led him to wondering whether his sutures had not been disposed of in the same manner as Lister's ligatures, and resulted in the experimental work in which he demonstrated that "along the tract of an aseptically buried suture, cell proliferation rapidly supervenes, and new cells invade the softened structure, and, *pari passu* with its absorption, a *living band of connective-tissue cells* replaces the whole line of the suture."

The work of these earlier writers has recently been confirmed by the experimental work of Sir Charles Ballance.[27] He used peritoneal ox ligatures, both plain and chromicized, and states that "when all the ligature has been absorbed and replaced by the living cells, the latter lose their pristine flexibility of form, become spindle-shaped, and spin fibrous tissue. The outline of the original dead material of ligature can be recognized by the shape and size of the fleshy mass of new living tissue which has been substituted for it."

It would seem, then, that when ordinary absorbable suture material is used, it often happens that there occurs a process of substitution, along with the absorption, which leaves a permanent living band of tissue in the place of the absorbed suture. The use of alcohol-preserved strips of fascia lata as suture material makes this end-result a certainty in all cases. Furthermore, the result is more quickly obtained, as there is no absorption.

1014 St. Paul Street.

ABSTRACT OF DISCUSSION

DR. HARVEY B. STONE, Baltimore: I have watched Dr. Koontz's experimental work with a great deal of interest. To me it was most remarkable to see a piece of fascia from one animal, which had been kept in alcohol for weeks and months, sutured into the living tissues of another animal and to find months later that it had been incorporated perfectly into the structures of its new host, without absorption and without foreign body reaction. As to the clinical appli-

21. Rehn, E.: Die homoplastische Sehnentransplantation im Tierexperiment, Beitr. z. klin. Chir. **68**: 417-447, 1910.

22. Lewis, Dean; and Davis, C. B.: Experimental Direct Transplantation of Tendon and Fascia, J. A. M. A. **57**: 540 (Aug. 12) 1911.

23. Hutchinson, J.: Hernia and Its Radical Cure, Oxford Medical Publications, London, Henry Frowde and Hodder & Stroughton, 1923, pp. 46-47.

24. Jamieson, H. G.: Medical Recorder, Philadelphia, 1827, pp. 286-288, quoted by Marcy, H. O.: The Anatomy and Surgical Treatment of Hernia.

25. Lister, Joseph: Remarks on the Antiseptic System of Treatment in Surgery, Brit. M. J. 301-304 (April 3) 1869.

26. Marcy, H. O.: The Anatomy and Surgical Treatment of Hernia, New York, D. Appleton & Co., 1892, pp. 291-292.

27. Ballance, Charles: Some Experiments on the Conduct and Fate of a Ligature Made from the Parietal Peritoneum of the Ox when Implanted in Living Tissue, Lancet **2**: 10-15 (July 3) 1926.

cability, in 1902 or 1903 McArthur called attention to the possibility of using strips of fascia in the repair of difficult hernias. Much more recently, Gallie popularized that process, using fascia lata as the source of his material. Quite recently, Cushing used strips of fascia to close defects in the dura in certain cases in which otherwise it would have been difficult or impossible to shut the dural spaces off from the nasal cavities. Dr. Koontz and I have planned to utilize fascia strips of his own preparation for the plastic repair of injured sphincter and muscles. In all these cases, it is a tremendous advantage to have the material bottled ready for use to avoid the necessity of a secondary operation on the patient to get this tissue, and to feel that the implant will serve quite the same purpose as though the material were derived from the patient himself. The suture materials commonly in use fall into two classes: the absorbable and the nonabsorbable. There are objections to both. The nonabsorbable suture material acts as a foreign body throughout the life span of the host or until it is discharged. Clinical observations have shown that as late as ten or twelve years after its introduction, this material may give rise to trouble. On the other hand, absorbable material is undependable as to the length of its existence in the body. By the very fact of being absorbed, it gives rise to an undesirable reaction and not infrequently leads to the accumulation of serum or exudates in the wounds which otherwise would be perfectly sterile. This material, which becomes incorporated into its host without reaction and without absorption, is, therefore, an ideal suture material, having the disadvantages of neither of the commonly used types of suture. But, as a matter of fact, it is something much more than a suture material, as Dr. Koontz has shown. It acts as a permanent scaffolding for the ingrowth of the host's own cells. It is entirely analogous chemically to his own fibers, and simply supplants those which have been lost, or makes good a defect. From the theoretical and the practical standpoint, this is a new process of utilization of fascia which deserves much wider use and which will, I think, give much more satisfaction than former methods.

DR. HENRY W. CAVE, New York: I think that the Gallie operation for the cure of large inguinal hernias, direct and indirect, has come to stay. It is sound and practical in every way, except for the obtaining of the fascia. Dr. Koontz has done away with the disadvantage of having an assistant drop out of the operation or of having another assistant come in to secure the strip of fascia from the thigh. Furthermore, his method removes the objection of some of the patients to the added incision on the thigh. At the Roosevelt Hospital we have done thirty Gallie operations with excellent results. Two of the thirty patients objected most strenuously to the added incision. I have used some of the needles that Dr. Koontz has described, but I have not used any of the suture material. His needle is a distinct improvement over the original Gallie needle.

DR. B. L. COLEY, New York: My experience has been almost entirely with living fascia sutures taken from the thigh. Three and a half years ago, I began to use them in the repair of hernias, and up to the present, I have operated on eighty-five hernias by this method. My experience with dead fascia is limited to five hernias in which I used ox fascia suture, sent to us by Dr. Koontz. It is too soon to comment on these cases. However, primary union of the wound occurred in all the cases. While we have only recently begun to use dead fascia sutures (sent to us by Dr. Koontz), their use appeals to me very much. The chief objection to the Gallie operation is the added incision on the thigh, which is a potential source of morbidity. If that wound becomes infected, healing will be long drawn out, and it will be a great advantage to those of us who are definitely committed to the use of fascia sutures, if we can rely on preserved animal fascia, trusting its sterility and ability to be incorporated without irritation in the tissues. I have twice had occasion to inspect hernia repairs following the use of living sutures, at periods of from six to nine months following operation, and I found that the sutures were round, firm, living cords resembling the flexor tendons of the wrist and intimately united to adjacent structures. These observations are in harmony with those of Gallie on the fate of living sutures in animals. On another occasion, I was requested not to make an incision on the other thigh when operating for recurrence after a Gallie operation. An incision on the same thigh disclosed that the defect (approximately 9 by 3 inches) had entirely been bridged over in the seven months period. Healthy living fascia was available at the site from which it had been taken previously.

DR. AMOS R. KOONTZ, Baltimore: I think it is evident to every one that there are some fundamental biologic questions involved here, and not just simply the question of a new suture material. These fibers will act as a framework for the ingrowth of new fibroblasts and will become repopulated with living cells until eventually a living structure has formed which actually functions as a living bridge and does not act in any way as a simple suture material. With reference to the absorption of kangaroo tendon, I do not know whether Dr. Hutchison used kangaroo tendon preserved in alcohol. I have used the ordinary kangaroo tendon in dogs that is supplied by Johnson & Johnson, and so far it looks as if it is absorbed. When the dogs were killed a couple of months after operation, the tendon was there, but it was very rotten. It pulled away with the slightest traction and did not act in any way like these strips of fascia.

GASTRIC SECRETION AFTER PARTIAL GASTRECTOMY *

EUGENE KLEIN, M.D.
NEW YORK

The excellent results obtained after partial gastrectomy for gastric and duodenal ulcers have been attributed to the fact that in a large percentage of cases an anacidity is produced. Thus, Lorenz and Schur [1] found that 75 per cent of patients were rendered anacid. In this hospital Lewisohn [2] reported 77 per cent of anacidities. Similar results have been obtained by others.

This study was prompted by three considerations. First, if 77 per cent of the patients were rendered anacid by the operation, why was not the same result obtained in the remaining 23 per cent? Second, some gastrojejunal and jejunal ulcers have recently been reported after partial gastrectomy. Did these occur in the cases in which acidity persisted? Third, since the absence of free acid in the stomach can be effected in various ways, what was the nature of the anacidity after partial gastrectomy?

Hydrochloric acid is considered by many one of the important factors in the genesis of ulcer. It is certainly not the only one, and probably not the chief one. Nevertheless, it undoubtedly exerts a decisive influence. Peptic ulcers commonly occur only in those areas that come into contact with the gastric juice; namely, the stomach and the duodenum. They are very rare in the normal jejunum, but as soon as a communication is established with the stomach, gastrojejunal and jejunal ulcers are no longer uncommon.

Experimentally, too, some of the most successful methods of producing ulcers have been those which, among other things, increased gastric acidity either by direct addition or by diverting the alkaline neutralizing duodenal juices from the stomach to other parts.[3]

* From the Service of Dr. A. A. Berg, and from the laboratory of the Mount Sinai Hospital.
* Read before the Surgical Section of the New York Academy of Medicine, May 18, 1926.

1. Lorenz, H., and Schur, H.: Unsere Erfahrungen über den Wert der Antrumresektion bei der Behandlung des Ulcus pepticum, Arch. f. klin. Chir. **119**: 239, 1922.
2. Lewisohn, R., and Ginzburg, L.: The Relation of Postoperative Achlorhydria to the Cure of Gastric and Duodenal Ulcers, Surg. Gynec. Obst. **44**: 344 (March) 1927.
3. The influence of acid is more fully discussed in a previous paper: Klein, Eugene: The Fundamental Principles of the Treatment of Gastric and Duodenal Ulcers, Arch. Surg. **13**: 730 (Nov.) 1926.

PHYSIOLOGY

A consideration of the physiology of gastric secretion shows that we cannot expect partial gastrectomy or, rather, antrectomy invariably to produce an anacidity. There are three important phases of gastric secretion. They have been termed the primary or psychic, the secondary or gastric, and the intestinal.

1. *Primary Phase.*—Stimulation of the senses of sight, taste and smell by appetizing food usually initiates gastric secretion. Of these sensory stimuli the most important are those of taste and chewing. The reflex arc from the sense organs to the stomach is completed by the vagi. If these are cut, the primary or psychic phase of secretion is abolished. This secretion usually starts shortly after the ingestion of food, and ends very soon after the cessation of chewing.[4] It is very important to remember that the response to the sensory stimuli varies very greatly in different individuals, depending on the amount of appetite, the state of hunger, the palatability of the food, and the surrounding conditions. This primary secretion is directly proportional to the amount of appetite. It is easily inhibited by unpleasant occurrences or surroundings.

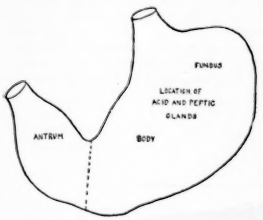

Fig. 1.—Location of acid and peptic glands in the body and fundus of the stomach.

2. *Secondary Phase.*—Certain substances when present in the stomach have the power of stimulating gastric secretions. The most important of these are meat extracts and the products of protein digestion. The different foodstuffs call forth a varying response. Meat produces the largest amount of secretion, bread a much smaller amount, and milk a quantity intermediate between these two. The secondary phase lasts from three to six hours, depending on the nature and the amount of the food.

By far the most interesting problem in gastric physiology is the mechanism of this secondary phase. The acid and peptic glands are in the body and fundus of the stomach (fig. 1), yet it seems fairly certain that stimulation of these areas by the presence of protein food or meat extracts does not cause any gastric secretion.[5] On the other hand, if the same foods are placed into an isolated pouch made from the distal third of the stomach, that is, the antrum, secretion of pepsin and hydrochloric acid follows in the body and fundus.[6]

The mechanism by which this is brought about is not definitely known. However, it seems that either some substance is formed in the mucous membrane of the antrum (a hormone) or some of the products of digestion are absorbed through the antrum. Whichever it may be, this substance is carried by the blood to the glands of the body and fundus and stimulates them to secrete. It is also possible that in addition to this humoral secretion there is a nervous stimulus from the antrum. The important thing to remember is that the secondary phase, the major part of the gastric secretion, is initiated in the antrum and not at the site of the gastric glands. It is precisely this portion of the stomach which is removed in the partial gastrectomy.

Mechanical stimulation in the form of distention may also initiate gastric secretion. Here too the pyloric portion of the stomach is a more potent site than the body and the fundus.[7]

3. *Intestinal Phase.*—Introduction of meat and meat extracts into the duodenum in appropriately prepared dogs results in gastric secretion.[8] But this secretion is very much smaller in quantity than the secondary secretion (Sokolow[8]). The latent period is from two to four hours (Ivy[8]). The relative importance of the intestinal phase in man we do not know. It may be responsible for a large part of the late secretion.[9]

4. *Continuous Secretion.*—There is one other phase of secretion that we know little about. In some individuals, without any apparent stimulation, there occurs a continuous gastric secretion reaching 50 cc. an hour. Carlson[10] states that the gastric glands are never completely quiescent, the continuous secretion ranging from 2 to 50 cc. an hour, some individuals being consistently low, and some consistently high. Carlson[11] suggests that this secretion may be due to a state of vagus tone.

We see, then, that apparently normal individuals will vary among themselves in the height of their gastric acidity. First there is the continuous secretion, which in some is next to nothing, in others very high. Then, following the eating of food, the primary, secondary and intestinal phases are superimposed on what continuous secretion may already exist. We know that the psychic secretion varies, and it is probable that the response to the secondary and intestinal also varies. Individuals, therefore, will fall into different secretory groups, a low, a middle and a high. Figure 2, in which

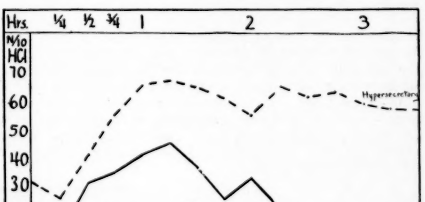

Fig. 2.—Types of curves in apparently normal persons: solid line, isosecretory; broken line, hypersecretory; dotted line, hyposecretory. In the charts the beginning of the curve indicates the fasting contents.

4. Carlson, A. J.: The Control of Hunger in Health and Disease, Chicago, 1916.

5. Grosz, Krschyschkowsky, quoted by Babkin, B. P.: Die äuszere Sekretion der Verdauungsdrüsen, Berlin, 1914, p. 120.

6. Sawitsch and Zeljony: Zur Physiologie des Pylorus, Arch. f. d. ges. Physiol. (Pflüger's) **150**: 128, 1913. Lim, R. K. S.; Ivy, A. C., and McCarthy, J. E.: Gastric Secretion by Local Mechanical Stimulation, Quart. J. Exper. Physiol. **15**: 12, 1925. Ciminata, A.: La sécrétion du "fundus" de l'estomac provoquée par des excitants chemiques appliquées sur la muquesne de la pars pilorica, dans un chien porteur de deux petits estomacs à la Pavlov, Arch. ital de biol. **76**: 38, 1926.

7. Lim, Ivy and McCarthy (footnote 6).

8. Sokolow: Diss. St. Petersburg, 1904, quoted by Babkin (footnote 5), p. 153. Ivy, A. C.; Lim, R. K. S., and McCarthy, J. E.: The Intestinal Phase of Gastric Secretion, Quart. J. Exper. Physiol. **15**: 55, 1925.

9. Garbat has done some work on the intestinal secretion in man, but the possibility of psychic stimulation and of gastric stimulation by regurgitation of food into the stomach was not eliminated (Garbat, A. L.: A New Method for Studying Pure Gastric Secretion, Am. J. M. Sc. **169**: 687 [May] 1925).

10. Carlson (footnote 4), p. 245.

11. Carlson (footnote 4), p. 234.

the terminology of Rehfuss,[12] hypo, iso and hypersecretory, is employed, shows these groups. Of these the isosecretory is the largest.

The hypersecretory group shows a curve very common in duodenal ulcer. This hypersecretion may be due to a hypertonus of the vagus, and may be one of the factors of the so-called ulcer diathesis.

It should be further stated that the acidity present in the stomach at any one time is due to the amount and rate of secretion and to the amount of neutralizing substances that are normally present. The latter are the food, the gastric mucus, the pancreatic juice, bile, intestinal juice and saliva.

CLINICAL OBSERVATIONS

Partial gastrectomy removes the antrum. It therefore removes the secondary or gastric phase of secretion.[13] To study the effect of this operation in man, the Rehfuss test meal was substituted for the Ewald, which has thus far been used. The tests were carried out over a period of three hours. The tube was

TABLE 1.—*Number of Cases Examined by Rehfuss Test Meals After Partial Gastrectomy*

Duodenal ulcers:		
Recent	12	
Old	12	
		24
Gastric ulcers:		
Recent	9	
Old	3	
		12
Gastrojejunal ulcers:		
Recent	4	
Old	2	
		6
Total		42

"Recent" refers to cases examined about three weeks after operation; "old" refers to cases examined about six months after operation.

swallowed from 18 to 19 inches. Roentgen-ray examinations in a number of cases showed that the metal tip was well above the stoma. The stomach was completely emptied, and then 8 ounces of gruel was fed to the patient. Specimens were withdrawn every fifteen minutes for three hours. The tube cannot be swallowed the usual distance (from 22 to 25 inches) after a gastroenterostomy or after a partial gastrectomy, since the tip readily passes through the stoma into the jejunum. Specimens withdrawn under such conditions would of course be anacid.

TABLE 2.—*Comparative Value of Rehfuss and Ewald Tests After Partial Gastrectomy*

	HCl +	HCl 0
Rehfuss	15	27
Ewald	7	8

Forty-two cases have thus far been examined. These are enumerated in table 1. "Recent" refers to cases examined before leaving the hospital, usually from two and one-half to three weeks after operation. "Old" refers to cases examined six months later. While these tests have yielded results which in the light of our present knowledge cannot be fully explained, since many of the facts elicited appear to be new, it was deemed advisable to report them.

In order to ascertain the comparative value of the Ewald and Rehfuss test meals for the determination of acidity, both of these tests were done in fifteen cases

TABLE 3.—*First Appearance of Free Acid in Rehfuss Test Meal After Partial Gastrectomy*

Hours	¼	½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾
Duodenal:											
Recent	4	2	2	1	1	...	1	..	...	...	...
Old	3	2	..	..	...	...	2	..	...	...	...
Gastric:											
Recent	1	1	..	..	1	...	...	..	1	1	...
Old	..	..	..	..	...	...	...	..	...	...	...
Gastrojejunal:											
Recent	2	..	1	..	...	...	...	..	...	...	...
Old	2	..	..	..	...	...	...	..	...	...	...

Acid appeared in ¼ hour or less in 20 cases, or 67 per cent.
Acid appeared in 1 hour or later in 10 cases, or 33 per cent.

after a partial gastrectomy. Table 2 shows that in all fifteen of these cases some of the quarter hour samples contained hydrochloric acid. In only seven of the Ewald tests was there free hydrochloric acid. Further, from table 3 it can be seen that in twenty of thirty cases after partial gastrectomy free acid first appeared in one hour or later. Since the Ewald meal is usually removed at the end of three quarters of an hour, it is evident that the acidity would not have been

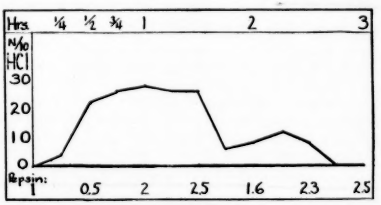

Fig. 3.—Acidity in patient L. H., partial gastrectomy for gastrojejunal ulcer, March 12, 1927: upper line, preoperative free acidity, Feb. 23, 1927; lower line, postoperative free acidity. The figures for pepsin are postoperative and denote millimeters of digestion measured on Mett tubes.

noted in ten of these cases. Incidentally, it may be stated that only one case of gastrojejunal ulcer during the past two years showed an anacidity in the Ewald. The Rehfuss showed free acidity ranging up to 72.

Following partial gastrectomy, the curves of the fractional test meals fall into three groups:

1. In one group there is an anacidity throughout the period of the test. Figure 3 is typical. The upper curve is the preoperative free acidity.

2. In the second group there is an anacidity for from one to one and a half hours and then a gradual rise to a free acidity of about 20, but this may reach to 40 or even higher. The highest figures are obtained after the stomach is empty. The primary anacidity seems due to abolition of the secondary phase and neutralization by food of any acid secreted during the primary phase. The late rise may be due to the intestinal phase or to continuous secretion which remains unneutralized. A typical case is shown in figure 4.

3. In this group acid is present throughout. Figure 5 shows such an extreme case (the highest we have had) in an individual with a marked preoperative acidity. The lower continuous line is the postoperative free

12. Rehfuss, M. E.; Bergeim, Olaf; and Hawk, P. B.: The Fractional Study of Gastric Digestion, with a Description of Normal and Pathologic Curves, J. A. M. A. **63**: 909 (Sept. 12) 1914.

13. Smidt, H.: Experimentelle Studien am nach Pavlov isolierten kleinen Magen, Arch. f. klin. Chir. **75**: 26, 1923. Koennecke and Jungerman: Der Einfluss des Pylorusmagens auf die Beschaffenheit des Magensaftes, Klin. Wchnschr. **2**: 973 (Oct.) 1923.

acid. One notices that at the beginning the acid runs along at a much lower level than before operation and then again there is a late rise. This lifting of the entire curve to a higher level seemed to be due to the fact that in this patient a high continuous gastric secretion was present independent of the food stimulus. A tube was given him to swallow and was not followed by any food or water; in other words, no stimulus was given for secretion. Aspiration every fifteen minutes yielded specimens containing acid concentrations shown by the

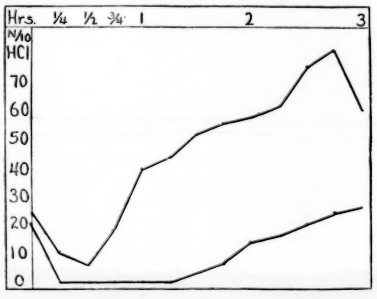

Fig. 4.—Acidity in patient C. P., partial gastrectomy for duodenal ulcer, March 2, 1927: upper line, preoperative free acidity; lower line, postoperative free acidity.

dotted line. The removal of one phase of secretion, the gastric, though it did accomplish a lowering of acidity, could not hope to effect an anacidity in the presence of such a powerful continuous secretion. This case is an extreme one. Others are found at levels varying from this extreme down to zero. It seems likely that whatever recurrences would take place would be found in this group.

In the experience of Drs. Berg and Lewisohn, though this operation has now been for five years the routine procedure, only two jejunal ulcers have been found after partial gastrectomy. In both of these acidity persisted after the operation. The gastrectomy in each case was done through a right rectus incision. In both, at the secondary operation it was found that not enough of the stomach had been removed. Others,[14] however, have reported recurrences even after extensive resections. Holst's [14] case is especially interesting since free acid persisted even after two thirds of the stomach was removed, and an ulcer recurred.

Since the level at which the antrum commences varies in different individuals, it is possible that where it extends upward unusually high a small portion of the antrum may be left in after partial gastrectomy. If that occurs, part of the secondary secretion will still remain and this may account for the persistence of acidity in some cases.

I have said that partial gastrectomy eliminates the gastric phase of secretion. When an anacidity is present it is due to neutralization of the small amount of acid secreted during the remaining phases. If this is true it should be possible to demonstrate this acid. Figure 6 shows a patient in whom an anacidity was present two hours. He was then permitted to chew half an orange. None of it was swallowed. Acid secretion followed, which during the period of one hour rose to 40. In others this effect was obtained by merely permitting them to watch patients eat appetizing meals. This is of course the psychic phase, unneutralized because no food has entered the stomach.

TABLE 4.—*Maximum Free Acid After Partial Gastrectomy in Fractional Test Meals*

	Anacid	0 to 20	20 to 50	50 and Above	Number of Cases
Duodenal:					
Before operation..	....	4%	36%	60%	50
Recent	9%	9%	46%	36%	11
Old	25%	41%	17%	17%	12
Gastric:					
Before operation..	....	28%	60%	12%	25
Recent	45%	33%	11%	11%	9
Old	100%	....	....	....	3
Gastrojejunal:					
Before operation..	....	11%	67%	22%	9
Recent	25%	25%	50%	....	4
Old	50%	....	50%	....	2

"Recent" refers to cases examined immediately after operation; "old," to cases examined six months after operation; "before operation" in gastrojejunal group refers to cases examined before partial gastrectomy.

Table 4 shows the highest free acidity recorded in Rehfuss test meals in forty-two patients examined after partial gastrectomy; in other words, after removal of the gastric phase. These are compared with figures found before operation.

In the group of duodenal ulcers there was a fairly marked immediate reduction. The hyperacid group is much smaller than before operation, and a total of 18 per cent are either anacid or hypo-acid. After six

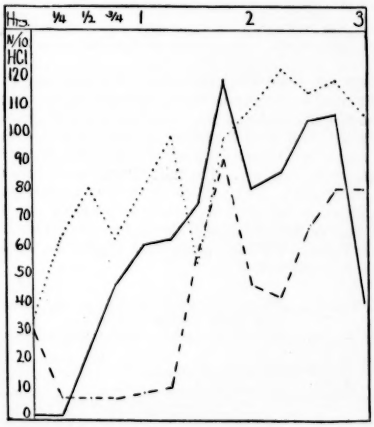

Fig. 5.—Acidity in patient C. B., partial gastrectomy for duodenal ulcer, March 26, 1927: solid line, preoperative free acidity; broken line, postoperative free acidity; dotted line, continuous secretion obtained after operation without any food stimulus.

months, however, 25 per cent become anacid and 41 per cent hypo-acid, a total of 66 per cent. Seventeen per cent still remain hyperacid. If recurrences come they probably will occur in this group.

In the gastric ulcer cases there is a marked immediate reduction. Almost half are rendered anacid. Three cases examined after six months were all anacid. It is probable that the higher acidity per-

14. Haberer, H.: Zur Frage des postoperativen Ulcus pepticum jejuni, Arch. f. klin. Chir. **140**: 395, 1926. Holst, J.: Recurrent Postoperative Jejunal Ulcer After Partial Gastrectomy (with English abstract), Norsk Mag. f. Lægevidensk. **88**: 111 (Feb.) 1927. Birgfeld: Ueber das Ulcus pepticum jejuni nach Magenresektion, Arch. f. klin. Chir. **137**: 568, 1925.

sisting after duodenal ulcer is due to the high continuous secretion which is so common in duodenal ulcers and relatively rare in gastric ulcers.

In the gastrojejunal group, half the cases were rendered anacid or hypo-acid.

The late reduction in acidity is difficult to explain. It was also noted by Lewisohn and Ginzburg [2] in their studies with Ewald test meals. Among the possible causes are a lowering of vagus tone, resulting in a lower level of continuous secretion, or a diminished irritability of the acid secreting cells.

Partial gastrectomy evidently does not effect such a decisive acid reduction as examinations by the Ewald test meal [15] have led us to believe. But the reduction is nevertheless much more marked than that after gastro-enterostomy. In sixty-two patients examined after gastro-enterostomy with an Ewald meal only two had an anacidity.[16] A Rehfuss test subsequently showed one of these to have a high acid. I am sure that Rehfuss examinations over a period of three hours with care exerted to see that the tip has not slipped through the stoma into the jejunum would show that anacidity

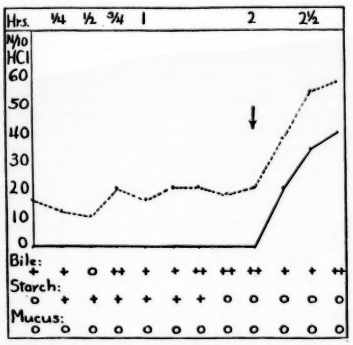

Fig. 6.—Acidity in patient B. J., partial gastrectomy for duodenal ulcer, Sept. 1, 1926: chewing (without swallowing) half an orange (indicated by arrow) followed by psychic secretion after primary anacidity.

is very rare after gastro-enterostomy. None of the gastric secretory phases are removed. Lowering of acid is due only to neutralization.

SUMMARY

1. There are three phases of gastric secretion following the partaking of food: the primary or psychic, the secondary or gastric, and the tertiary or intestinal. Of these, the gastric is the most important.

2. Though the acid cells are situated in the body and fundus of the stomach, food, stimulation of these parts does not cause the gastric secretion. Stimulation of the antrum or distal third does. Partial gastrectomy removes the antrum and therefore the secondary secretion.

3. The foregoing three phases are superimposed on a continuous secretion, which varies in normal persons from almost nothing to 50 cc. an hour. A high continuous secretion is characteristic of duodenal ulcer. It is uncommon in gastric ulcer.

4. The production of an anacidity depends on the potency of the remaining phases after the gastric phase is removed. If the secretion is moderate or small, it is readily neutralized. If a very high rate of continuous secretion is present—as in duodenal ulcer—it may not be.

5. These facts lead to the production of three types of curves after partial gastrectomy: (*a*) an anacid curve; (*b*) a curve in which the free acid starts after one or two hours and slowly rises; (*c*) a curve in which free acid is present throughout.

6. The removal of the antrum and the secondary phase by partial gastrectomy produces an immediate hypo-acidity and anacidity in 78 per cent of gastric ulcers and 18 per cent of duodenal ulcers. After six months these percentages rise to 100 per cent and 66 per cent, respectively.

1192 Park Avenue.

15. Lorenz and Schur (footnote 1). Lewisohn and Ginzburg (footnote 2).

16. Lewisohn, R., and Feldman, R. H.: Failure of Gastro-Enterostomy to Effect a Decisive Reduction in Gastric Acidity, Ann. Surg. **81**: 925 (June) 1925.

ACTIVE IMMUNIZATION IN SCARLET FEVER

SUMMARY OF PRESENT STATUS *

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Four years ago the Dicks established the relationship of the hemolytic streptococci to scarlet fever and provided a test which was at the same time an indication of susceptibility and a measure of success in active immunization.

Several things have combined to prevent a wide enough use of the immunization methods to permit us to speak with the degree of authority possible in the case of toxin-antitoxin. The campaigns for prevention of diphtheria have kept scarlet fever prevention in the background, and disagreements as to dosage, origin of material, and results have also interfered.

TABLE 1.—*Dick Tests, January, 1924, to April, 1927*

15,978	well persons of all ages, unselected. 34 per cent positive, 66 per cent negative.
9,954	persons of all ages, without history of scarlet fever. 40 per cent positive, 60 per cent negative.
1,016	persons of all ages, with history of scarlet fever. 14 per cent positive, 86 per cent negative.
735	convalescents of all ages. 8 per cent positive, 92 per cent negative.
42	scarlet fever patients of all ages, late in disease. 12 per cent positive, 88 per cent negative.
(1,793	persons of all ages, recovered from scarlet fever. 11.5 per cent positive, 88.5 per cent negative.)
586	scarlet fever patients of all ages, early in disease. 77 per cent positive, 23 per cent negative.
3,679	children, unselected, under 16. 47 per cent positive, 53 per cent negative.
913	adults, unselected. 21 per cent positive, 79 per cent negative.

It seems worth while, therefore, to make a brief summary of the statistics available in print, to determine, as far as can be done on this basis, what our further procedures should be. The idea appeared simple, but investigation shows that comparatively few statistics can be used, on account of incompleteness of information. Statements of percentages without actual numbers are useless, in view of the fact that so many writers on biologic subjects make percentages on numbers not only under 100, but often under 20. Records of the number of positives, or the number of successful

* From the Department of Hygiene and Preventive Medicine, Western Reserve University School of Medicine.

results, without accurate statements as to the number of negatives, or the number of unsuccessful results, must remain as matters of opinion, and for this reason the numbers reported in this summary will appear small. No series has been used in which the total number examined or treated, the number of positives and of negatives, and the number of successful and of unsuccessful eventualities are not clearly stated.

Table 1 deals with the Dick test, and is self-explanatory. Comments on the variability of the test will be made farther on.

Table 2 summarizes available information on all forms and modifications of toxin now being used. Vaccinations with organisms alone are not presented, as the information was not such as to admit of correlation with the toxin. A glance at this table shows that the samples recorded, when summarized, are fairly adequate in size, and the appreciation that the first two, representing the types most used in America, represent a summary of the work of a number of users, gives us a fair line on public opinion. I wish it clearly understood that my interest is in the fundamental value of active immunization in scarlet fever, and not in the presentation of evidence in favor of one or another method.

TABLE 2.—*Immunization Results.*

Dick material (filtered toxin)	*Change from Dick + to Dick —* *No case totals given* Zingher	Dick
Less than 2,000 units		
523 cases—67.5% success	..	Less than 14%
2,000-10,00 units		
987 cases—76% success	70%	22–66%
10,000-25,000 units		
209 cases—75% success	..	73–92%
Over 25,000 units		
66 cases—97% success		
1,785 cases—74% success		

Larson material (whole culture and sodium ricinoleate)
3,000-8,000 units
1,111 cases—84% success

Celarek material (toxin and organisms + formaldehyde)
3,500 units
14,106 cases—62% success

Bela Johan material (whole culture + phenol)
3,000 units
1,045 cases—84% success.

As this series (table 2) depends entirely on the change from a positive to a negative Dick test, it is clear that we should know how much weight to place on such evidence. The difficulties that inevitably follow the absence of satisfactory laboratory animals for standardization, and the consequent necessity of using man, are well known. Review of the literature shows definitely certain points: Since the beginning it has been appreciated that the test is quantitative and that changes in the amount of the skin dose will make changes in the numbers of negatives. It seems clear that there is a group which is very definitely immune, in which even a large increase in the number of skin doses will have no effect, and that there is a smaller group which is very susceptible and reacts even to fractions of one dose. In addition there is an intermediate group in which a variation between one and ten skin doses will materially change our figures, a sort of borderline group. It seems probable that this group has been the cause of many of the disagreements. The most complete work on this subject has been done by Young, who found that in a group of twenty-four Dick positives, treated with full doses of toxin, he got from zero to 11/24 positives, by the use of increasing amounts of skin test dosage. It may well be that a routine procedure involving a serious multiple of the original required test dose may be necessary. This is a matter on which there should be more statistics, for while the few available are very suggestive, others may not agree.

Evidence also indicates that in spite of the best intentions, toxins from different sources, or even from the same source at different times, may not be equivalent in unit value. Whether this is due to variation in the toxin itself or to variation in the local susceptibility of the human group used for testing cannot yet be decided on an accurate basis, but the facts seem incontestable. These points affect, of course, both the immediate results of an active immunization and the question of duration.

There is also disagreement as to whether the severity of the skin reaction bears any relation to the severity of a subsequent infection with scarlet fever. The trend of opinion seems to be in favor of such a relation, but cases actually analyzed are few, and, with the present low virulence wave of the disease, caution in interpretation is advisable.

I am at present engaged in an attempt to evaluate active immunization on the basis of the comparative number of scarlet fever cases per thousand in selected groups when the actual numbers involved, the age groups, and the actual number of cases of scarlet fever among treated and untreated are known, but no preliminary Dick test was made. This is still in the preliminary stages, and will require another year for completion; but in a series of school children totaling nearly 29,000, about 8,000 received one or two doses of sodium ricinoleate vaccine, while 21,000 did not. The work was begun during the rise of the seasonal curve, and in a rather susceptible group. When only one dose had been given, the incidence per thousand was two and one-half times greater in the untreated, and when two doses had been given it was more than six and a half times. While the exact significance cannot be finally stated, weight is added by the fact that the investigation covered three distinct and separate areas, the smallest of which had more than 1,000 children treated.

Whether it is time to give up preliminary Dick tests in children is not under discussion here, but it seems worth while to get epidemiologic evidence from various points of view, and it is thoroughly appreciated by public health officials that, the fewer actual operations, the better the psychology.

In summation, it appears to me that the procedure of active immunization justifies itself in its records, and that further careful reports dealing with standardization of the test itself will do much to blow away some of the unnecessary clouds which prevent a clear view of the subject. If half the persons treated can be protected even for a period of only two years, use of the method at the early ages should very materially reduce the mortality in the first ten years of life.

Life a Continual Change of Structure.—Physiology teaches that life is a continual change of structure. The structural basis of all tissue, muscular, nervous, connective, etc., is the cell. The life of the tissue consists in chemical combination of the protoplasm or substance of the tissue cells with the nutritive materials derived from foodstuffs and the oxygen of the air. The distinctive property of the cell—that indeed which makes it living—is its power of taking to itself and converting to its own substance materials that are not living. This is a double process; for, just as the potential stuff is seized and wrought into live tissue, so the outworn, dead matter which is no longer of use is cast off and ultimately expelled from the body.—Goldmark: Fatigue and Efficiency.

A TRAUMATIC HEMATOMA INFECTED WITH BACILLUS WELCHII

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This case is interesting because of (1) the long period after injury before infection declared itself; (2) the prompt reduction of fever on cleansing of the wound, and (3) the marked effect of gentian violet on a secondary staphylococcic infection.

REPORT OF CASE

G. S., a well developed, well nourished woman, aged 17, was admitted to the Colorado General Hospital, Feb. 14, 1927. Three weeks previously she had injured her left leg above the knee in a coasting accident, the toboggan having run into a post. Her clothing was badly torn and the skin of her leg above the knee was deeply lacerated but the muscles were not torn. The leg was very painful and by the time she got to a physician it was swollen from hip to knee and was black and blue. The physician said she had broken a blood vessel. There were sharp pains in the leg for twenty-four hours, but after that only soreness without pain. She was in bed four days with the foot elevated. The swelling and discoloration remained for two weeks but finally disappeared except for a large swelling just above the knee.

On admission there was no pain but she appeared flushed. The swollen area above the knee was about 10 inches long and 3 inches wide, black and blue, with a large break in the skin which was scabbed over. This area was very tender and there was a small tender area in the left groin also. A provisional diagnosis of hematoma with possible thrombosis in the left femoral vein was made by the admitting intern, Dr. L. E. Thompson, who prescribed initial treatment with hot applications.

A blood count, February 15, showed 4,500,000 erythrocytes and 7,850 leukocytes, with a differential of 76 per cent polymorphonuclears and 24 per cent small lymphocytes.

The temperature was 99.2 F. on admission but fell to 89.6 F. shortly, where it remained until February 16 at 8 a. m. But on the afternoon of that day it began to rise rapidly, reaching a peak of 103.8 F. at 8 p. m., as indicated in the chart. The pulse rate also increased from 80 to 130 and the respiratory rate from 20 to 30 per minute. There was pain in the abdomen and the groin of the left side. It is unfortunate that no attempt was made to take cultures of the blood during this period of fever.

February 17, at 10:30 a. m., the scab was removed, the hematoma was opened, and a large pocket of necrotic tissue was thoroughly cleaned out by Dr. C. B. Lyman under general anesthesia. There was no evidence of gas. A drainage tube was left in the wound, which was then covered with a dry sterile dressing.

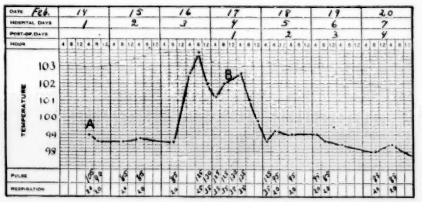
The fluid contained numerous erythrocytes, polymorphonuclear leukocytes, and many large gram-positive rods. Blood agar plates inoculated with the fluid remained barren on incubation for forty-eight hours, but deep brain medium produced pure cultures of *B. welchii*, type 2 (No. 1213) showing all of the well known characteristics of this species, nonmotility, stormy fermentation of milk, short thick gram-positive rods, opaque biconvex disklike colonies in deep agar, obligate anaerobiosis, and the like. A 500 Gm. guinea-pig inoculated subcutaneously with 2 cc. of a twenty-four hour dextrose broth constricted tube culture was found dead next day and showed on necropsy the skin separated over the entire ventral surface because of extensive emphysema and lysis. There was some edema but no evidence of hemorrhage in the animal.

The rapid depression in the fever, pulse and respiratory curves of the patient was striking, and an uneventful and rapid recovery seemed assured, the patient being up in a chair, February 27.

March 3 and daily thereafter until March 19, 2 per cent mercurochrome-220 soluble was applied to the wound.

I did not see the wound again until February 28. It then presented two sinuses discharging a yellowish brown pus without marked odor. The deepest sinus extended away from the knee and was about 10 cm. deep. The pus showed numerous polymorphonuclear leukocytes, but no bacteria could be stained. Culture on a blood agar plate showed a few colonies of a yellow staphylococcus and a green producing streptococcus. The source of these secondary infections is uncertain, but a subsequent swab from the throat, from which the tonsils had been imperfectly removed, showed both organisms, so that they might have come from that focus either as an endogenous or as an exogenous infection.

Deep brain cultures from the wound again developed *B. welchii*, which was isolated only after some difficulty owing to the failure of this strain to form resistant spores until the cultures had aged for at least five to ten days. Several times brain cultures 4 days old boiled for one minute (94 C. at Denver) showed only streptococci in the subcultures. On the other hand, dilutions in deep agar even when made from enriched cultures apparently containing many nonmotile rods and only a few diplococci showed only streptococcus colonies in those tubes in which the colonies were sufficiently well separated for isolation. The aerobic stapylococcus and streptococcus were eventually eliminated, however, by selective heating of an old (10 day) brain culture at 80 C. for twenty minutes. Dr. W. H. Welch, in a recent letter, recalled that in his first communication he missed spore formation altogether, but further study soon corrected this error. It is well known that *B. welchii* forms few if any spores in mediums containing an excess of fermentable carbohydrate, and even in brain medium,



Temperature, pulse and respiration in a case of traumatic hematoma in which there was infection with Bacillus welchii: *A*, admission; *B*, operation.

which contains only a trace, several days must often elapse before conditions for sporulation become favorable.

March 4, the wound was unchanged in appearance. The pus still showed many polymorphonuclear leukocytes, some of which contained gram-positive cocci. There were also a few cocci not phagocyted. This time the blood agar plate showed numerous colonies of staphylococci but no streptococci; nor was there any evidence of either *B. welchii* or streptococcus in deep brain cultures or subcultures therefrom. From this time on the infection remained a pure staphylococcus infection. Results identical with those of March 4 were obtained on March 8 and again on March 17. The culture of staphylococcus obtained March 17 was studied in some detail and found to correspond to Hucker's[1] *Micrococcus aurantiacus;* it reduced nitrates to nitrites and failed to liquify gelatin. The organism from the throat was also identical with that from the wound in all respects.

March 19, I suggested the use of gentian violet, following Churchman,[2] as the wound was healing so slowly. At this time the deepest sinus was about 6 cm. deep. A swab was taken for bacteriologic examination; about 2 cc. of boiled

1. Hucker, G. J.: The Classification of the Micrococci, Abst. Bact. **9**: 1, 1925; A Study of the Characters of Primary Importance in the Differentiation of the Micrococci, Centralbl. f. Bakt. 1, Orig. **95**: 109, 1925; Studies on the Serological Relationships of the Species of Micrococci, ibid. **95**: 123, 1925; The Species of the Genus Micrococcus, ibid. 2 Orig. **64**: 481, 1925.

2. Churchman, J. W.: The Selective Bactericidal Action of Gentian Violet, J. Exper. Med. **16**: 221, 1912; The Toxicity of Gentian Violet and Its Fate in the Animal Body, ibid. **18**: 579, 1913; Treatment of Acute Infections of the Joint by Lavage and Direct Medication, J. A. M. A. **70**: 1047 (April 13) 1918; The Selective Bacteriostatic Action of Gentian Violet and Other Dyes, J. Urology **11**: 1 (Jan.) 1924.

aqueous gentian violet solution (1:1,000) was then introduced to the bottom of the sinus by means of a small catheter attached to a Luer syringe. The swab showed many pus cells and numerous cocci, some intracellular, some extracellular, and the blood agar plate developed innumerable colonies of staphylococci.

March 20, the wound appeared clean with a thin watery bluish exudate. The swab went in about 5 cm., breaking through adhesions. About 1 cc. of gentian violet solution was introduced and left in the sinus. The swab showed a few pus cells, but no cocci could be detected in stained smears, and the blood agar plate showed only fourteen colonies.

March 21, the wound was obviously healing rapidly; the swab penetrated to about 3 cm. and a few drops of gentian violet was again introduced. Both red blood and a few pus cells appeared on the stained smears, but no cocci could be seen. However, the plate showed six colonies.

On this date a small boil appeared on the neck of the patient, which was lanced. A culture showed *M. aurantiacus.*

March 22, the surface of the wound was swabbed off with alcohol and dressed without opening. No gentian violet was used.

March 23, it was found to be about 1 cm. deep. A swab was taken and a few drops of gentian violet introduced. The swab showed a few pus cells but no bacteria. However, the plate developed 145 colonies of staphylococcus, showing the effect of neglecting this treatment even for a day. Notwithstanding, the wound continued to heal without further treatment, and a swab made, March 21, from the reddened area of the wound gave a sterile culture. The patient was discharged on that day.

COMMENT

A careful search of the literature for data on infected hematomas was disappointing; there seem to be practically no references except for the work of Hertzog [3] and of Neuhof and St. John,[4] neither of which gives any information of bacteriologic value. Welch [5] quoted Harris' isolation of the "gas bacillus" in pure culture from an abscess containing blood and pus in the neck of a dog following an operation on the jugular vein. There was no gas in the abscess, and the condition somewhat resembled that which I have described. Welch also described three instances of aneurysms infected with the "gas bacillus." One hesitates to suggest that a given case is without recorded precedent, but this really seems to be true so far as I can determine from a careful study of the literature. Dr. W. H. Welch, who kindly read this article before it was submitted for publication, also stated that he could not recall a case precisely like this one.

It was remarkable that the patient should survive for three weeks without evidence of infection and that it should then suddenly develop. Infections with *B. welchii* usually develop rapidly following injury, leading to gaseous gangrene which is generally fatal within from twenty-four to forty-eight hours. But this is when the organisms are carried deeply into the tissues and the syndrome is complicated and accelerated by mixed infections. In the present instance, it seems that the organisms must have been deposited superficially, that they were not removed in the preliminary treatment of the wound, and that they found entrance to the bloody fluid in the hematoma only perhaps by extension from beneath the scab, or that the infection was hematogenous in origin. The first conjecture seems more plausible, but there is considerable evidence in the literature that metastatic infections with *B. welchii* either from the intestinal tract or from other foci may occur.

Gwyn [6] recorded a case in which *B. welchii* was isolated from the blood circulation on three separate days; there was no history of external injury, but the parotid gland was suspected as a portal of entry. Bloodgood [7] cited an infection of a gangrenous leg through the circulation, and Welch [5] listed three examples of multiple or metastatic emphysematous gangrene in addition to several probable cases in the older literature inadequately proved bacteriologically. Cole [8] added a case in which the blood culture was positive two and one-half hours before death, and Young and Rhea [9] another in which *B. welchii* could be demonstrated during life.

All these cases were fatal, and it was generally assumed that the invasion of the blood stream with *B. welchii* was an agonal invasion. But in 1914, Baugher [10] recorded four cases with positive and carefully checked observations of *B. welchii* in the blood stream, three of the patients recovering after cholecystectomy or biliary curettage. There were no metastases in these cases, but it is a fair conjecture that if there had been external injury of a suitable sort there might have been.

It might seem remarkable also that there was no emphysema in a hematoma infected with *B. welchii.* But while emphysema is a common symptom of wound infections with *B. welchii,* it is by no means so common in blood infections. In none of the cases just cited [11] was there any evidence of gas in the blood. Welch [5] clearly recognized that the gas bacillus could be recovered not infrequently from nonemphysematous lesions both before and after death. Leroy [12] described a case of Welch bacillus infection in the neck adjacent to the tonsil which on operation did not show gas, and other records are cited by Simonds,[13] who has shown that the production of gas in cultures depends on the degree of oxygen tension reduction.

I myself have frequently recovered *B. welchii* from the heart's blood and from the peritoneal fluid at human autopsies following peritonitis in which there was no evidence of emphysema.

SUMMARY

In a case of hematoma following a severe bruise of the leg due to a coasting accident there was an incubation (?) period of three weeks before a pure infection with *B. welchii* appeared. The development of the infection was coincident with high fever, accelerated pulse and respiration, which promptly returned to normal on operation. Recovery was slow and complicated by a secondary infection with a green producing streptococcus, and more particularly by

3. Hertzog, U.: Ueber traumatische Gangrän durch Ruptur der inneren Arterienhäute, Beitr. z. klin. Chir. **23:** 643, 1899.

4. Neuhof, Harold, and St. John, F. B.: Infective (Secondary) Hemorrhages from War Wounds, Surg. Gynec. Obst. **29:** 130 (Aug.) 1919.

5. Welch, W. H.: Morbid Conditions Caused by Bacillus Aerogenes Capsulatus, Bull. Johns Hopkins Hosp. **11:** 185, 1899.

6. Gwyn, N. B.: A Case in Which the Bacillus Aerogenes Capsulatus was Repeatedly Isolated from the Circulation During Life, Bull. Johns Hopkins Hosp. **10:** 134, 1899.

7. Bloodgood, J. C.: Fractures, Dislocations, Amputations, Surgery of the Extremities, and Orthopedics, Progr. Med. **4:** 151, 1899.

8. Cole, Rufus: Note on a Case of Infection by Bacillus Aerogenes Capsulatus in Which the Organism was Identified in the Circulating Blood During Life, Bull. Johns Hopkins Hosp. **13:** 234, 1902.

9. Young, E. B., and Rhea, L. J.: Infection with the Bacillus Aerogenes Capsulatus Following Abortion: A Report of Two Cases in One of Which the Bacillus Was Recovered from the Circulating Blood During Life, Boston M. & S. J. **160:** 401, 1909.

10. Baugher, A. H.: The Bacillus Aerogenes Capsulatus in Blood Cultures with Recoveries, J. A. M. A. **62:** 1153 (April 11) 1914.

11. Gwyn (footnote 6). Bloodgood (footnote 7). Cole (footnote 8). Young and Rhea (footnote 9). Baugher (footnote 10).

12. Leroy, Louis: A Case of Aerogenes Capsulatus Infection of the Neck, J. A. M. A. **41:** 1009 (Oct. 24) 1903.

13. Simonds, J. P.: Studies in Bacillus Welchii with Special Reference to Classification and to Its Relation to Diarrhea, Monograph 5, Rockefeller Inst. M. Research, 1915.

M. aurantiacus. The use of gentian violet seemed to hasten healing.

There seems to be relatively little literature on infected hematomas and none referring to their infection with *B. welchii*.

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Clinical Notes, Suggestions and New Instruments

HYDATID CYST OF THE APPENDIX

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Reports on cases of hydatid cysts involving the intestine are exceedingly rare. In Lyon's[1] report of 241 cases in a series in North America the intestine was involved in only one case. There have been several cases reported as abdominal hydatids, but there is no mention of the intestine. Garrahan[2] reports a multivesicular abdominal hydatid in a girl, aged 10 years. Cameron[3] reports a large suppurating abdominal cyst in a girl, aged 10 years.

The foregoing cases, with the exception of Lyon's series have been reported from countries outside of North America, where the disease occurs rarely. The disease is infrequent enough to warrant the report of the following case:

REPORT OF CASE

F. R., a German, aged 45, seen, June 23, 1927, had a temperature of 102 F. and complained of pain and tenderness in the right iliac region. Examination of the abdomen revealed a marked right rectus rigidity and a palpable mass, the size of an orange, at the base of the cecum. The patient had had a swelling in that region for several weeks and the day before I saw him, as he bent over a fence, he experienced a peculiar sensation, as if something had burst within; this was followed by sharp pains to that part of the abdomen where he had previously noticed the swelling. The swelling disappeared and two hours later he reported an urticaria extending over the entire surface of his body.

A white blood count showed a slight leukocytosis, namely, 11,200; the differential count showed: polymorphonuclears, 68 per cent; lymphocytes, 12 per cent, and eosinophils, 20 per cent. Because of this eosinophilia there was some doubt as to the diagnosis, so that a tentative diagnosis of a ruptured appendix with a localized abscess was made.

I operated, with the assistance of Dr. A. E. Peterson. When the abdominal cavity was opened by a right rectus incision, a white cartilaginous mass protruded; this cystic mass was opened and a great number of small cystlike bodies were found. The appendix could not be located, but instead there was this cystic mass extending from the base of the cecum to the lateral peritoneal wall, to which it adhered very closely. On further examination another cyst was found extending from this region retroperitoneally upward under the right lobe of the liver.

Both cysts contained many daughter cysts, which were removed with the fluid of the cyst, the wall of the mother cyst being left intact. A drain was placed into the retroperitoneal cyst and the incision was closed. The man made an uneventful recovery and was discharged from the hospital nineteen days after the operation.

COMMENT

The fluid obtained from the cyst was examined under the microscope and the characteristic scolices and hooklets of *Taenia echinococcus* were demonstrated, which made the diagnosis evident.

When the patient was examined fifty-four days after the operation, no symptoms of a recurrence were present.

1. Lyon, I. P.: A Review of Echinococcus Disease in North America, Am. J. M. Sc. **123**: 124, 1902.
2. Garrahan, J. P.: Multivesicular Hydatid Cyst Simulating Bacillary Peritonitis in a Ten Year Old Girl, Presna med. Argent., 1919, p. 221.
3. Cameron, S. J. M.: Large Suppurating Hydatid Cyst in a Girl Aged Ten, Glasgow M. J. **75**: 379, 1911.

Physical Therapy

THE FOLLOWING ARTICLE HAS BEEN APPROVED BY THE COUNCIL ON PHYSICAL THERAPY OF THE AMERICAN MEDICAL ASSOCIATION. H. J. HOLMQUEST, SECRETARY.

THE INFLUENCE AND THERAPEUTIC USE OF EXTERNAL HEAT

PHYSIOLOGY AND USE IN INTERNAL MEDICINE
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USE IN NERVOUS DISEASES
THEODORE H. WEISENBURG, M.D.

USE IN SURGICAL AND ORTHOPEDIC CONDITIONS
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USE IN DERMATOLOGY
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This is the first of the series of articles to be published by the Council for the purpose of setting forth the known merits and limitations of physical therapy.

PHYSIOLOGY AND USE OF HEAT IN INTERNAL MEDICINE

The use of external heat in the sense ordinarily understood by that term was a familiar therapeutic procedure to the ancients of Greece and Rome, who constructed elaborate establishments for the practice of hydrotherapy in various forms and also made use of naturally occurring thermal springs, such as those still frequented at Aix les Bains. Notwithstanding the application of heat to an increasing variety of conditions, the manner in which it accomplishes its purpose has been, until recently, poorly understood, chiefly owing to the fact that the actual conduct of most physical therapeutic measures has been in the hands of persons untrained in medicine.

One of the outstanding phenomena, obvious even to the layman, in the systemic application of external heat is the more or less profuse sweat induced. This occurrence has given rise to the popular idea of "elimination," which has found great favor with the laity and has even crept into medical writings in an uncritical way. The conception of what is eliminated has been vague, and small account has been taken of other and equally important changes induced. The last few years have been productive of new data, however, and, while much remains to be investigated, a fairly clear concept is now afforded of what occurs in the physiologic sense when the human body is exposed to heat.

The physiologic influence of external heat must be considered from the points of view of systemic and local exposure. The effects of systemic exposure will be discussed first, as they are necessary to an understanding of the subject as a whole.

Heat must be considered also, from the standpoint of its therapeutic use, under two general headings; viz., dry and wet. Dry heat includes exposure to the heat of the sun, to hot air and to heat radiated from heated articles, such as hot bricks and sand, electrical resistance coils, electric lamps and the actual cautery. Another form of exposure is afforded by "diathermy," but this will be considered elsewhere, since the heat in this instance is supposedly developed, not by an external object, but by the electrical resistance of the tissues

themselves to a current passed through them. Consideration of heat from the sun involves other factors and will be taken up later under actinotherapy and radiation.

Wet heat includes the hot bath, steam and mud baths, and the hot pack administered by means of wrapping the body in hot blankets or other coverings.

The penetration into the tissues of heat from the sources here considered, namely, heated objects, electric light bulbs, resistance coils or hot baths depends on the particular apparatus but is never great under therapeutic conditions. Following local exposure, there is directed to the part an increased circulation of blood which tends to keep the temperature of the tissues constant. The blood itself is also warmed but the heat-regulating mechanism of the body operates to maintain the temperature of the blood nearly constant in health, and it is therefore difficult or impossible to "heat up" deep lying structures by increasing the degree of heat or prolonging the application. However, superficial structures, such as the skin, tendons and fibrous tissue, are actually heated to a limited degree. In systemic exposure to heat, the penetration from the sources mentioned is the same, but bodily radiation obviously becomes inadequate eventually and an actual rise of body temperature as a whole results.

The effects of systemic exposure to dry and wet heat are much the same in principle and will therefore be discussed together, except when certain differences necessitate particularization.

One of the earliest effects to be noted after systemic exposure to heat is that on the circulation. Thus, the pulse rate rises more or less proportionately to the rise in body temperature [1] in the ratio of about ten beats for 1 degree F.,[2] much as it does in fever.

The effects on blood pressure, of external heat and cold, are somewhat varied.[3] Some observers believe that all baths at a temperature much above or below that of the body raise blood pressure [4] but, in general, in normal persons warm baths probably tend to lower blood pressure and cold baths tend to raise it. There are some exceptions to this rule, and a bath above 40 C. (104 F.) may give a blood pressure above normal, while a cold bath may occasionally induce a temporary fall in blood pressure preceded and followed by rise.[2] If exposure to external heat is in the form of a bath, there takes place, in addition, a diuresis dependent on the immersion of the abdomen in the water.

Systemic exposure to external heat generally produces a more or less well marked hyperpnea or overventilation of the lungs. This increases roughly parallel with the rise in body temperature, and water vapor is lost in large quantities through the expired air. Systemic exposure to heat in any form results, therefore, in a loss of fluid from the body through the lungs and sweat and, following baths, through the urine also. This causes a temporary loss of weight.[2] Following extreme sweating a slight concentration of the blood [5] tends to arise, but it is doubtful whether this takes place in any important degree under the usual conditions of clinical practice.[6]

Next to the kidneys the skin is, in man, the most important accessory channel for the elimination of water, and the salt excreted in the sweat may amount to ten times that normally present in the feces.[7] The sweat also contains, qualitatively, certain other substances occurring normally in the urine, such as urea, ammonia, uric acid, amino-acids, creatinine, phosphates and sulphates,[5] and it may also contain glucose. The elimination of these substances, especially water, salt and urea, forms the basis of the use of the sweat process in various forms of nephritis accompanied by edema or high blood urea nitrogen. There is large clinical support for belief in the value of this measure in nephritis, in which its influence is undoubted as regards salt and water. As regards the compensatory elimination of nitrogenous substances, there is some evidence to indicate it, but there are those who doubt "vicarious" excretion of nitrogen on the part of the sweat glands, and it seems that perspiration does not always lead to a decrease of urea in the urine.[8]

It is not generally appreciated that carbon dioxide, a chief end-product of metabolism, escapes through the urine and sweat, as well as through the lungs, and one of the most fundamental effects of exposure to heat appears to depend somewhat on the increased loss of carbon dioxide through these three channels. As a result of the rise in the body temperature or hyperpyrexia, the general body metabolism is increased, and carbon dioxide is formed in quantities larger than normal. The overventilation through the lungs, however, washes out the carbon dioxide in even greater proportionate amounts, and part of the excess is furthermore lost through the urine and sweat. There also results from the heightened metabolism an increase in the phosphates and sulphates from the breakdown of protein, but these acid substances find their escape through the urine. In addition to the loss of all these substances, it has also been shown that the urine and the sweat contain fatty acids, including lactic acid, which are probably increased in amounts during exposure to external heat. The net result, therefore, of the loss of these various acid substances, chiefly carbon dioxide, is to leave a relative excess of alkali in the blood and probably in the tissues.[9] The blood becomes too alkaline, a systemic alkalosis results, and the excess of alkali is then eliminated through the urine and sweat until the normal acid-base equilibrium is restored. The urine and sweat thus generally change their reaction, becoming less acid, alkaline, or more alkaline. A sustained alkalosis may lead to tetany; it constitutes one of the sources of danger in the improper therapeutic use of external heat.[10]

A great loss of water and salt consequent on exposure to heat induces serious consequences unless this loss is partly compensated by ingestion. This loss may be one of the factors, together with the alkalosis referred to above, which induce the severe cramps in the muscles occasionally seen among stokers and other workers in extreme heat. In the clinical application of external heat, water is usually administered, but it is obvious that achievement of conditions that bring about sweating may be prevented or delayed unless the amounts and temperature of the water are considered.

1. Adolph, E. F., and Fulton, W. B.: Am. J. Physiol. **67**: 573 (Feb.) 1924.
2. Bazett, H. C.: Am. J. Physiol. **70**: 412 (Oct.) 1924.
3. Pemberton, Ralph: Ann. Clin. Med. **5**: 763 (Feb.) 1927.
4. Hinsdale: Hydrotherapy, Philadelphia, W. B. Saunders Company, 1910. Bazett (footnote 2).
5. Flinn, F. B.: Am. J. Physiol. **70**: 194 (Sept.) 1924. Gram: Proc. Exper. Biol. & Med. **21**: 137, 1923. Barbour, H. G.; Dawson, M. H., and Neuwirth, I.: Am. J. Physiol. **74**: 204 (Sept.) 1925.
6. Bazett (footnote 2). Cajori, F. A.; Crouter, Caroline Y., and Pemberton, Ralph: J. Biol. Chem. **57**: 217 (Aug.) 1923.
7. Myers in Barker: Endocrinology and Metabolism, New York, D. Appleton & Co. **3**: 512, 1922.
8. Von Noorden, quoted by Matill in Barker: Endocrinology and Metabolism **3**: 867, 1922.
9. Cajori, F. A.; Crouter, C. Y., and Pemberton, Ralph: The Alleged Rôle of Lactic Acid in Arthritis and Rheumatoid Conditions, Arch. Int. Med. **34**: 566 (Oct.) 1924.
10. Cajori, Crouter and Pemberton (footnote 6).

The physiologic changes induced by local exposure of a part to heat are along the lines just described, but more intensive treatment is obviously possible because the process can be longer continued. Relaxation of tissues is induced, especially of the muscles, together with a hyperemia probably due to dilatation of blood vessels and a greater total blood flow in the area concerned. Local sweating also takes place, and the tissues are put in a condition to benefit more than they otherwise would by such measures as massage and passive motion or even active motion. If the local use of heat is continued too long, a systemic response may take place, dependent on a general hyperpyrexia, comparable to that following systemic exposure. This may be an advantage or disadvantage according to the conditions present, but must be considered in feeble patients or those already being exposed to systemic heat. The effects of heat locally will be further developed under the local use of heat in surgery.

FORMS OF APPLICATION

Dry Heat.—The various means and methods of applying physical therapy in almost any of its forms constitute specialties in themselves, and within the small compass of the present article only those features can be considered which are essential to a general understanding of the subject.

Apart from the familiar hot water bag, the most common mode of application of dry heat is that afforded by the electric light bulb. For local application, the apparatus usually takes the form of a parabolic mirror, suitably mounted, with the lamp at the focus so that the issuing rays are parallel. The apparatus can be held in the hand, or it is mounted on a stand and can be directed toward any part. For more intensive local use a boxlike container, with or without an internal reflecting surface, open at the ends and equipped with light bulbs, is placed over the limb or part, with the patient in the sitting or reclining position.

For systemic exposure, lights are usually placed within a "cabinet" or large box containing a reflecting interior surface and large enough to allow the subject to sit on a chair, the head emerging through the doors or other covering at the top. The number of lights in such an apparatus may be from twenty to fifty or more, subject to control in small groups. For exposure in the recumbent position, the lights are placed within a troughlike semicircular container, also bearing a reflecting interior surface and about 5 feet in length. This is placed, with the concave side down, over the subject, whose head is allowed to emerge at one end. Blankets are placed over the whole, and drawn snugly around the neck and face in order to prevent undue radiation.

Dry heat is also administered in the form of hot air, but this usually requires elaborate equipment for the purpose of heating the air and is hardly available to the general practitioner, except in a few institutions. Electrical resistance coils placed within a boxlike container also afford a useful means of obtaining dry heat, especially for application to limited areas such as a knee or ankle. These various forms of apparatus can all be obtained on the market under various trade names, and they can be improvised at home with excellent results when necessity demands. Dry heat of lesser intensity can also be supplied for local purposes in the form of a resistance coil of flexible wires, properly insulated and covered with cloth, for such uses as those to which the familiar hot water bag is put.

One of the most important uses of dry heat in a local sense is that afforded by the actual cautery, which may be heated by flame or fire, as in the old days, or, more appropriately, by the electric current. The chief use of this is for destructive purposes in dermatologic conditions, including new growths, and will be discussed under that heading. The actual cautery has also long been used as a "counterirritant" in sciatica, though less so now than formerly. Probably some of its effects are due to the reaction from protein split products and the "shock" of the burn.

Wet Heat.—Probably the oldest form of the systemic application of heat is the hot bath. The presence of thermal springs scattered throughout the world has given rise to elaborate establishments for their utilization, but as far as heat per se is concerned almost equally satisfactory results can be obtained in many instances by the simplest forms of apparatus, such as the ordinary bath tub. The water used may be pure or it may contain various salts or other substances, such as magnesium sulphate or carbon dioxide, intended to increase or add to the effects. The temperature of the water varies, of course, according to the purpose of the bath, and this question will be considered under therapeutic indications.

Next to the hot bath, the most frequently employed form of moist heat is that afforded by the so-called hot pack. This consists in principle in wrapping the body in a sheet or blanket made hot by being dipped in hot water of about 82 C (180 F.), and subsequently wrung out more or less thoroughly. Obviously the severity of application will depend on the temperature of the enveloping sheet or blanket, and this effect will be further influenced by the number of blankets superimposed on the subject to prevent evaporation and cooling. Occasionally, the sheet or blanket placed on the body is below body temperature, constituting the "wet pack," under which circumstances the effect of heat is achieved through a conservation of the body heat by wrapping the subject with many blankets to prevent as much evaporation as possible.

Another form of exposure to moist heat is the steam bath, although this is by no means so widely employed as the hot water bath. A home-made apparatus can usually be "rigged up" in any household by means of large steam kettles, an oil lamp and a frame to elevate the bedclothes. The steam "room" has long been in use, and consists simply of a chamber into which steam under low pressure is allowed to escape. The disadvantages here are that the patient must breathe the hot moist air, and a better form of application is that in which the subject sits in a cabinet or lies in a sort of box with his head outside. There is some danger, however, in this procedure, as burns have occasionally been caused by faulty steam pipes or joints. In some instances, electric resistance coils supply steam under low pressure in a manner well adapted to this purpose.

The mud bath is an old form of application of moist heat but, in general, depends on the availability of certain soils, heated by thermal springs or artificially, and need hardly be considered at length here. The forms of wet heat that have been described are used chiefly for systemic treatment, but a useful local application of moist heat can also be made by means of the so-called whirlpool bath. This consists of a receptacle of suitable shape, usually deep and rather narrow, containing warm or hot water made to circulate rapidly by means of a laterally placed water jet. The part to be treated, usually an arm or a leg, is placed within the receptacle,

and the temperature of the water is gradually raised to the desired point. The motion of the water intensifies the effect of the heat for any given temperature and has other advantages through its impingement on the tissues.

THERAPEUTIC INDICATIONS AND PRACTICE

The therapeutic indications for the use of external heat can be grouped under the two general headings of general exposure and local exposure, according to whether a systemic or a local effect is desired. Systemic effects find their application for the most part in medical, as contrasted with surgical, conditions, and are valuable chiefly in the following disease states or syndromes: nephritis, acute or chronic; arthritis and rheumatoid conditions, in which either local or systemic heat or both may be used; and neurologic conditions, including neurasthenia, functional psychic disturbances and the true insanities.

The therapeutic indications for the use of heat locally are chiefly in the following fields: surgery, especially orthopedic, following fractures, dislocations, sprains, cicatrization after operative procedures and the like; arthritis, when a limited influence on a joint or joints is desired; and certain dermatologic conditions, in which a destructive influence is desired. Another disease state in which local heat has been alleged to have value is pneumonia. The form of heat known as diathermy has been advocated; but, for the reasons already given, discussion of this will be found under the heading of electrical procedures.

NEPHRITIS

There is probably no other condition in which the systemic use of external heat may have such specific early consequences as in nephritis. Whatever other pathologic manifestations may accompany nephritis, those which most imperatively demand treatment are dependent on the retention of toxic material, presumably of a nitrogenous nature, salt or water.

As already pointed out, some workers doubt the vicarious removal of nitrogenous substances through the skin, when elimination through the urine is reduced, but clinical experience is in favor of the view that something of this nature may occur. Furthermore, it is possible that some other toxic substances whose nature is not yet known may also be removed at the same time. It is well recognized, however, that the degree of toxicity does not run precisely parallel with the accumulation of nitrogenous substances. Thus, patients with uremia may show a disproportionately small rise in the urea nitrogen and, on the other hand, patients with marked increase in the urea nitrogen may present few or no clinical evidences of intoxication. It is safe to say, however, that in nephritic conditions accompanied by marked laboratory evidences of retention of nitrogen, or by clinical evidences which suggest the toxemia consequent on such retention, the sweating process is to be actively considered. The earlier symptoms of headache or nausea and even the later picture of coma or convulsions may apparently be benefited at times by sweating.

The argument has been advanced that, in the presence of toxemia from renal insufficiency and retained nitrogen, sweating serves only to concentrate the blood and to add to the danger from the retained substances.[11] There is some doubt as to the validity of this, however, as the blood maintains its water balance with great tenacity, drawing on the tissues for this purpose, and the evidence is not final that under conditions of ordinary therapeutic procedure the blood undergoes any true concentration.[3] Furthermore, in the absence of inability to excrete water there would seem to be no objection to the administration of fluid to prevent concentration, as is indeed the practice in most hospitals. There is, furthermore, definite evidence that in conditions accompanied by retention of blood nitrogen the sweat may contain nitrogen in amounts larger than normal.[12]

Finally, it should be stated that the results believed to be achieved may be due to changes induced by heat in the blood flow; to an alteration of metabolism; or, in nephritis accompanied by acidosis, to the production of a systemic alkalosis as above described. Whatever the mechanism and whatever the difference of opinion as to the benefits obtained, however, it is probable that many experienced clinicians would be unwilling to withhold application of the sweat process in the toxic nephritis under discussion.

The other renal syndrome in which the sweat process has great value, and medical opinion is unanimous on this point, is that accompanied chiefly by retention of salt and water. While the bowels may be made the channel for elimination of water in large quantities, by hydragogue cathartics, water can also be eliminated in equal or even greater amounts through the sweat. Evidence has been presented that salt may be removed through the sweat channels in amounts equal to or larger than those occurring in the feces.

In the presence of edema or anasarca of renal origin, the hot pack or general body bake may have some of its most brilliant consequences, and the loss of fluid from the tissues may be obvious almost from the start. Usually, however, many treatments are required.

In all these conditions the physician must be guided by good judgment in the application and severity of the measures used. The guiding principle must be that benefit can be forthcoming only when the patient is in a position to withstand treatment of such severity and respond to it, and the physician must be on his guard lest contraindications appear, such as cardiac decompensation, circulatory collapse or high fever. It is sometimes necessary, however, to push treatment even in the presence of such contraindications.

The particular manner in which heat is systemically applied in nephritis is of secondary importance; but the simplest form, and one that can be carried out in any household, is the hot pack already briefly mentioned. This properly comes under the topic of hydrotherapy, however, and the further details of its application will be there discussed. It is of the highest importance that the proper technic be followed to insure results. A method requiring less labor is that afforded by the electric light "baker." The patient is enveloped snugly in a blanket, the electric light "baker" is placed over the body, with the exception of the head, and the various apertures of the appliance through which heat might escape are covered with several blankets, as is indeed the whole apparatus. The number of electric lights to be used must be determined by experience, and the current should be controlled by a switch on the outside of the "baker." A thermometer should be placed above the body of the patient, but under the covering blanket, and, in order that the temperature may be easily and frequently determined, it should be fastened to a

11. Foster: Textbook of Medicine, edited by Cecil; Philadelphia, W. B. Saunders Company, 1927.

12. Cajori, Crouter and Pemberton: Unpublished observations. Riggs: J. M. Research 24: 289, 1911.

cane or yardstick. A common mistake in this connection is to place the thermometer above the blanket exposed to the full influence of the lights, at which point it does not indicate properly the temperature to which the subject is actually exposed, and the process as a whole may be therefore unduly curtailed. The usual practice is to begin by elevating the temperature within the apparatus to 49 C. (120 F.) and to maintain this temperature for twenty minutes, after which the lights are turned off and the patient is allowed to remain wrapped in the blanket until he has cooled down to normal. The duration and temperature of the process must vary with circumstances, and it is always well, except in emergencies, to err on the conservative side especially at the outset. The body temperature may rise from 0.5 degrees to 1.5 degrees F. and it is customary to place an ice cap on the head and to administer water. Too much water, however, may prevent the degree of hyperpyrexia necessary to determine sweating, and it is also obvious that, in the presence of edema, ingestion of water may partly defeat the purpose in mind. Usually one glass of cool water during the bake is ample. It is sometimes advisable to include only part of the body, especially the loins, in the "bake," leaving the chest outside. Pulmonary edema has resulted from careless or undue application in severe nephritis.

Considerable prostration may occasionally follow the general procedure described; and, furthermore, although the effect of any one "bake" may be inappreciable, the effect of many treatments is sometimes cumulative. In few diseases is any single measure to be regarded as the only one to be relied on, and this is eminently true of the use of the sweat process in nephritis. The use of the skin as an emunctory organ must be accompanied by full use of the other channels, especially the bowels, and by such medication and control of protein, salt and fluid intake as modern conceptions of medicine require.

ARTHRITIS AND RHEUMATOID CONDITIONS

The field in which the application of external heat, both systemically and locally, has its most extensive and varied application is probably that of arthritis and rheumatoid conditions. The full benefits to be derived from the systemic use of heat in this connection are, however, not always forthcoming from the heat alone, and sometimes depend on contrasting and accessory applications of cold. The latter phase of treatment constitutes an essential part of hydrotherapy, and the details of the conduction of this measure in its various forms will be considered in the section devoted to that topic. The matter will be discussed here sufficiently merely to indicate the general application of heat to the rheumatoid syndrome.

In view of the considerable confusion that still exists regarding the nomenclature and classification of the arthritides, as well as of the underlying pathologic changes concerned, there is no stereotyped guide to be followed in selecting cases appropriate for this treatment.

Those patients who are fairly robust afford the best opportunity for this practice. It is important to remember that systemic exposure to heat in any form may occasionally have distressing consequences, either immediately or after a course of treatment, and it is therefore essential to exercise caution in subjecting to such treatment those patients ill equipped to stand it. Those forms of arthritis which are thought, perhaps, to withstand such therapy best and to benefit most from it are cases of the degenerative or so-called hypertrophic type in middle aged, well nourished women, although the proliferative or so-called atrophic type may be equally helped. It must be pointed out here, as in connection with nephritis, that exposure to heat or hydrotherapy constitutes only one measure of treatment in the rheumatoid problem, and must not be followed except in correlation with other established principles of treatment. Especially is this true in relation to the important influence of focal infection. A patient with arthritis should not be subjected to the measure under discussion unless and until a complete medical examination has indicated the justifications and indications for it. For generations the laity have frequented sanatoriums of all kinds where these measures have been applied in a wholesale way with the result that, although these measures have undoubted therapeutic value, failure and detriment have also followed.

As mentioned in the section on physiology, belief in the value of "elimination" in this disease has long been popular, but there is only limited evidence to support this as an important factor in itself. There is, however, definite evidence that some of the other effects achieved by exposure to heat play an important rôle in the treatment of arthritis. These effects are chiefly those arising from the heightened circulation and the increased metabolism induced. Evidence of changes in the circulation is to be seen in the obvious influence on the skin capillaries of the contrast baths or douches so successfully used in institutional treatment at the conclusion of the "bake" or hot bath. A true "metabolic whip" is afforded by cold water properly used.

The "bake" or bath may be given alone, however, in which case profuse sweating is induced and the subject is allowed to rest for an hour or more to compensate for the somewhat debilitating effects; or, more frequently, the exposure to heat is briefer and sufficient only to inaugurate or induce a mild diaphoresis. Following this procedure, which is generally administered with the patient in a sitting posture, a "tonic" shower or douche is given, beginning considerably above body temperature and shortly reduced to slightly below body temperature. This is best accomplished by an attendant who directs on the patient a jet of water, the temperature of which is under control. An exposure of about eight minutes to the electric cabinet "bake," followed by a so-called scotch douche or other form of cooling hydrotherapy, permits the subject to go at once out into the air with a sensation of exhilaration and well being instead of lassitude. There is also exercised at the same time an influence on the nervous system which, in the end, may be quieted by the process described, notwithstanding the apparent "shock" of the cool or cold water. Even persons of robust constitution should be subjected only gradually to these procedures; but by beginning cautiously even highly asthenic types can be educated to stand them and be benefited by them.

The sweating process alone, without the cooling contrast shower, is easier of attainment and can be brought about by means of the hot pack or hot bath in almost any household. In many instances the metabolic stimulus given by this single procedure is of great value and should be utilized when circumstances justify it. Some of the effects of cooling hydrotherapy can be achieved by means of the bed sponge or bath, but care must be used to avoid chilling. If the sweating process is prolonged and perspiration is profuse, the patient must rest for an hour or more before rising, or depletion and fatigue will result.

The general regimen briefly outlined can be carried out more or less successfully in the home, but the full achievement there of such results as follow the conduction of these measures by skilled hands in adequately equipped institutions can hardly be expected.

Much of the benefit of treatment at institutions is made possible by the incidental removal of the patient from causes of worry and fatigue, and to this can often be added the stimulus of new surroundings.

LOCAL APPLICATION OF HEAT IN ARTHRITIS

The application of external heat locally to a joint or joints in arthritis is often of the highest value. The principle obtains here, as elsewhere, that reliance must not be placed on this measure alone. It must be considered in conjunction with other principles of treatment of the disease as a whole, and the joint in particular. The measure most often used in conjunction with local external heat in arthritis is massage and, although often misused at ignorant hands, it constitutes an almost necessary adjunct to the use of heat alone, especially in the form of effleurage. The forms of heat available for local use are discussed at the beginning of this article. The value of the heat can sometimes be enhanced by incorporating with it some other principle, as in the use of a hot saturated solution of magnesium sulphate applied to the affected part and kept hot by repeated application or a radiant lamp. This procedure sometimes greatly relieves pain. Application of heat should not be carried to the point of irritation and should depend for its effects on repeated use, once or twice a day, over a period varying from about ten minutes to half an hour. The temperature within the apparatus should not be above about 82 C. (180 F.), or the duration of treatment greater than twenty minutes at the outset. Temperature and length of exposure can be slowly increased. Local sweating generally occurs, and the part should be kept warm after the treatment. If a region such as the shoulder is baked for a long period, a systemic reaction may occur comparable to that following systemic exposure, the results of which may be depleting or otherwise undesirable.

THE USE OF HEAT IN DISEASES OF THE NERVOUS SYSTEM

Heat can be used to advantage in both organic and functional nervous diseases.

HEAT IN THE PSYCHOSES AND PSYCHONEUROSES

Heat can be used either systemically or locally. The value of the systemic use of heat is best demonstrated in the treatment of that type of psychosis in which there is present either a mania or an agitated depression. In both conditions the bodily activity is the result of the dysfunction of the mentality. In such patients, with active delusions and hallucinations, there is nothing that quiets them more than a so-called continuous hot bath. This is better called the continuous neutral bath, as the temperature generally averages around 36 C. (96 F.) and after the patient is immersed he experiences no sensation of either heat or cold. Such baths have been in use for years in well equipped hospitals for the insane. In consideration of the fact that even in general hospitals acute manic outbreaks are likely to occur from various causes, it would be well if most such institutions were so equipped.

The equipment and the method of handling the patients are as follows: Large tubs are used of sufficient length to accommodate the patient comfortably. They are frequently equipped with canvas slings which can be used to keep the patient from contact with the bottom of the tub. The temperature is controlled by a mixer which regulates the temperature of the water. The attendant, however, must always use a bath thermometer as a check on the thermometer in the mixer. Patients are kept in the continuous bath for various periods of time depending on their condition. No clothing is worn. The soles of the feet and the palms of the hands are well greased before the patient gets into the tub. Many patients receive their meals while in the water, sleep there, and may be kept there for days at a time. The continuous bath offers a means of inducing sedation which is unparalleled so far as physical measures are concerned. The effects are sometimes very striking. Excited mental cases and pure nervous cases, such as chorea, are controlled by this means much more rapidly than by the use of drugs. In all cases it is imperative that some one familiar with this type of physical therapy be in constant attendance to prevent accidents and to make sure that the temperature of the water is kept at the desired point.

In case the equipment for continuous baths is not present, hot tub baths can be used. Cold packs, next to continuous hot baths, quiet active patients perhaps better than anything else.

Cold packs are given in the following manner: The full length of a mattress is covered by a rubber sheet, over which are placed two or three wool blankets. A sheet is rung out in cold tap water and spread over the topmost blanket and the patient laid on it. The sheet is wrapped about the patient and folded over the feet and about the shoulders. The topmost blanket is brought up over the patient and another blanket is spread over him and tucked beneath him. The second lower blanket is folded over the patient and another one spread over him and tucked beneath him. The third or greater number of blankets is folded about the patient in this manner. An ice bag is placed on the patient's head, which is supported by a small pillow. The patient is allowed to remain in the pack until, following the "reaction" and the conservation of body heat, he begins to perspire freely and sometimes for a considerable period after that depending on his condition. Cold packs offer a very effectual means of restraint in excited cases, as well as produce a marked sedative and therapeutic action. Cold packs are seldom used in the presence of circulatory or cardiac derangement or with patients in much weakened states; therein lie the contraindications to their use.

The systemic use of physical therapy in the treatment of psychoneuroses had its inception under the direction of Dr. S. Weir Mitchell. In the so-called rest cure, named after him, the use of electric light baths, combined with hydrotherapy, massage and moderate exercise, is of great benefit. The same causes which operate in the production of the arthritides, for example, in one patient, may produce a neurosis in another; therefore the physician should be guided by the same general outlook already referred to and by a balanced conception of therapy.

In the psychoneuroses the so-called tonic electric bakes, given every day and followed by hot and cold contrast showers, afford a great stimulus to the patient. Hydrotherapy in the form of hot and cold showers alone can be given daily. The method of application of these procedures has been already commented on under the subheading "Arthritic and Rheumatoid Conditions," but it must be again emphasized here that electric "bak-

ing" with hydrotherapy is only a part of the general treatment and dependence on it alone will not gain very much.

ORGANIC NERVOUS DISEASES

Heat is of the greatest value in inflammations of the peripheral nerves and in vascular diseases in which the nervous system is implicated. In the various neuritides, such as intercostal neuralgia or inflammation of any of the nerves in the limbs, heat, and particularly dry heat, allays the inflammation. In intercostal neuralgia, care must be taken to give a sufficient amount of treatment, for the penetration here must be deeper than in the limbs. Here heat is only one mode of treatment, as frequently a neuritic condition is part of an arthritis, and electrical treatment, principally in the form of diathermy, will be much more efficacious.

In certain vascular diseases of the limbs, such as erythromelalgia, Raynaud's disease, thrombo-angiitis obliterans, thrombophlebitis and endarteritis obliterans, dry heat applied to the diseased parts more or less constantly over a period of days may cause an alleviation of the symptoms. It is not a cure and is only a means of alleviation of pain. The modern operation of sympathectomy offers much more hope of permanent relief.

Even in chronic diseases of the nervous system, such as hemiplegia or lateral sclerosis, when the limbs are spastic, heat will decrease the spasms and contractures, at least for a time, and will moderate other symptoms.

HEAT IN SURGICAL AND ORTHOPEDIC CONDITIONS

As has been pointed out, local application of heat produces relaxation of the tissues, particularly of the voluntary and involuntary muscle fibers. Spasm of the skeletal muscles is relieved, the walls of the smaller arteries seem to relax, and the vessels dilate. By reason of these conditions, a greater amount of arterial blood flows to the part, bringing oxygen and nutriment. Furthermore, the increased blood flow induced on the venous side carries away in larger degree the products of normal or abnormal metabolism, so that they do not remain as local poisons or irritants but are excreted from the body through natural channels.

Numerous conditions occur in various parts of the body in which normal physiologic activity or metabolism is interfered with, as a result of local injury or disease or even as a part of a general "slowing of metabolism" throughout the entire body. If metabolism of the tissues locally becomes permanently lowered, the function of the member or part of the body becomes impaired. With lessened gross mechanical function of the part there is lessened chemical or metabolic activity, because motion or function is a prime factor in the flow of the blood and in the oxidation of the tissues. Thus, a vicious circle may become established.

As a result of local injury there may be hemorrhage, exudation, effusion, swelling, increased pressure or tension and pain. The increased tension narrows the lumen of the veins or completely occludes them and blocks the flow in the lymphatics. Greater swelling, even of distal parts, results. Possibly, as a result of the blocking of venous flow, capillary tension becomes so increased that the capillaries rupture. Anemia and even death of tissues may ensue. Later scar tissue forms, and as it contracts it constricts blood vessels and interferes with function of nerves. This grossly disturbs the mechanical function of the member by limiting or abolishing the motion of muscles and their tendons; and of joints, through fibrosis of ligaments and capsule, or by adhesions within the joint.

Immediately following an injury, there is an inflammatory reaction with heightened local metabolism and elevation of temperature. This condition is usually treated by rest, elevation, and the application of cooling lotions. But the succeeding subacute and chronic stages with swelling, sluggishness, anemia and lowering of metabolism are to be treated by the application of heat, massage, and passive and active motions carried out in a manner to avoid repetition of traumatism of the structures already injured. To speed up a "lowered local metabolism," to remove the products of hemorrhage and exudates into the tissues, or effusions into the joints, and to restore chemical and mechanical function, are the objects of treatment.

In the following conditions, the application of heat, accompanied later by massage, may be of value. It must be emphasized that the use of heat in surgical conditions is not to be considered alone but only in connection with general surgical principles; and that its benefits are often obtainable only by the coincident use of massage, for which it paves the way.

TRAUMATIC CONDITIONS

1. *Fractures.*—A simple fracture of the shaft of a long bone, not involving a joint or near a joint and not complicated by a marked or persistent swelling at the site of the fracture or of the extremity distal to the fracture, may not require this form of treatment. But fractures into or about the joints, such as Colles' fracture or Pott's fracture, accompanied by swelling at the site of the fracture and particularly by swelling of the hand or foot, are best treated by baking followed by massage. This treatment should be begun within a few days after reduction of the fracture.

Care must be taken not to displace the fragments during the treatment. It is of the utmost importance to prevent fibrous ankylosis of the fingers, which is caused in large part or altogether by persistent swelling of the hand. Such persistent swelling of the hand may occur as a result of any severe traumatism to the upper extremity, whether a fracture or a dislocation. It is to be combated by attention to the dressing to prevent interference with the circulation, by elevation of the hand, by persistent active movement of the fingers, and by baking and massage.

Function of the joints of both the upper and lower extremities should never be lost sight of in dealing with any fracture of the extremities. Baking, massage and passive and active movements are the chief available means for the maintenance or restoration of normal motion. Treatment should be continued as long as swelling and limitation of motion persist, or as long as there is tenderness at the site of the fracture.

2. *Sprains and Dislocations.*—Treatment is similar to that of fractures near joints as just described. Splints or casts should be removed and replaced again after the daily treatment by baking and massage. On the whole, fixation by a removable plaster splint and daily baking and massage are to be preferred to strapping with adhesive plaster, which does not permit of physical therapy.

3. *Traumatic Synovitis.*—After the first stage of acute inflammation lasting from one day to possibly a week, the secondary stage of absorption of effusion and restoration of function of the joint begins. During this stage, baking and massage are vitally important in aiding these processes.

4. *Contusions and Muscle Sprains.*—Similar means of treatment are valuable also in these conditions to secure absorption of the products of hemorrhage, to eliminate swelling and pain, and to secure restoration of function. Collections of blood, if not absorbed, may form cysts or may be infected through the blood stream and become abscesses. The development of such abscesses after local injury is not uncommon. It is of importance to secure as early absorption of blood clots as possible. Treatment should be continued as long as tenderness in the injured part persists.

5. *Bursitis.*—This condition, often seen about the elbow and shoulder joints, for example, and resulting from acute or chronic strain, is susceptible to improvement or cure by baking and massage.

INFLAMMATORY CONDITIONS

During the acute stage of inflammatory conditions of joints and bursae, the application of heat may be more harmful than beneficial, although acute bursitis may be favorably influenced by diathermy. The duration of the primary stage depends largely, of course, on the kind and the virulence of any infection which may be present. An infection of a joint may produce a simple synovitis, a plastic arthritis or a severe purulent arthritis and the course and duration of the disease may vary greatly. In general, it may be said that for these conditions baking and massage are to be begun after the acute inflammatory reaction has disappeared. The object of the treatment is first to remove the products of inflammation, such as effusion into the joint or exudate in the tissues about it; secondly, to aid in the removal of fibrous tissue formation, which limits joint motion; and, finally, to loosen all muscles or tendons which normally move the joint and are bound by adhesions within the sheath, outside the sheath or in the bursae. Even in fairly severe cases of fibrous ankylosis, some benefit is to be obtained by this method of treatment, while in the milder cases even complete restoration of function in the joint may be expected. Before performing any operation on or about such a joint, the surgeon should employ baking and massage persistently and faithfully for some weeks or months to secure as much improvement as possible.

In the condition of flatfoot due to traumatism, or possibly to infection, semirigid and spastic feet can frequently be made more flexible by these means of physical therapy, in conjunction with the use of proper supports for the feet.

CHRONIC BACKACHE

A complete discussion of chronic backache would occupy many pages. There are probably many causes for chronic backache and the treatment must vary according to the etiology, but by far the largest percentage of cases is probably due to muscle and ligamentous strain, either arising acutely from some traumatism or occurring slowly from a chronic strain, such as that due to bad posture. The site of the trouble may be about the lumbosacral joint or occasionally the sacro-iliac joint, but it is most commonly observed in the lumbar region of the back, where the points of tenderness are found to be at the tips of the lumbar transverse processes where the lumbar muscles, particularly the quadratus lumborum, are attached. This condition can be profitably treated by baking and massage, by proper means of support for the muscles and ligaments which are under strain, and by properly graded exercises to strengthen the muscles and to improve posture. Acute attacks of what might be called myositis or lumbago are also advantageously treated by baking and massage, by a support, or by complete rest in bed for the time being.

METHODS OF APPLICATION OF HEAT

Heat may be applied by means of hot fomentations or by the use of hot water bottles and electric pads, but the best means of application is by baking the part. Various types of apparatus may be used, such as the baker which contains numerous electric light bulbs, or an electric or gas baker. The temperature in the baker may be raised to a point between 94 and 205 C. (200 and 400 F.). The higher the temperature employed, the greater care must be used to keep the skin covered with layers of flannel or woolen blankets to avoid blistering. The length of each treatment is usually about one-half hour. Following the baking a thorough massage should be given. The parts should then be kept warm and not cooled off rapidly by going out into the cold immediately after treatment.

HEAT IN DERMATOLOGY

Heat has an effective therapeutic value in the destruction of neoplasms on the surface of the skin and in accessible mucous cavities and, more exceptionally, in the treatment of larger malignant tumors to which the knife was formerly exclusively applied.

Heat may be developed externally in a wire or other metallic electrode, or it may be developed in living tissues through the body resistance.

It is an elementary electrokinetic principle that the heat developed in a conductor is proportional to the product of the resistance of the conductor, the square of the current, and the time. The temperature developed will depend, however, on many other factors, such as the specified heat of the tissues and the heat losses due to conduction to surrounding tissues, especially by the blood stream and by radiation at the surfaces.

Heat may also be developed by other means than electricity, as is exemplified in the hot iron used in early days, or in the more refined and more readily controlled Paquelin cautery. The latter is comparable in effect with the electrocautery.

The electrocautery is a valuable method in the treatment of small cutaneous growths, such as keratoses, moles pigmented and otherwise, warts, and small epitheliomas. With platinum-iridium electrodes of different sizes and shapes, rendered incandescent by the passage of electricity, small growths can be removed with little or no resultant scarring. The degree of destruction of tissue can thus perhaps be more readily predetermined by those with relatively little experience than with the use of methods presently to be discussed. Owing to carbonization, the heat does not reach great depth.

ELECTRODESICCATION

Electrodesiccation is a term applied to the generation of heat in the body tissues from the application of a high frequency current of the Oudin type to the surface of the body. This method was first introduced by Pozzi of Paris in 1907, and improved by Doyen, a fellow countryman. W. L. Clark of Philadelphia is to be credited with further technical improvements. The application is usually made with a unipolar single electrode current, the heat being concentrated on the surface tissue by an arc from a metallic electrode. A fine needle, such as is used for ordinary sewing, or a pointed wire (copper, steel or other metal), is used and the air arc is usually only a few millimeters in length. The tissue

treated becomes grayish white and is dehydrated—hence the name. In some cases the needle is brought just in contact with the surface, or the needle may be inserted into the tissue more or less deeply, depending on the degree of destruction desired. The Oudin current is of relatively high voltage and of low amperage.

The apparatus now available for this treatment is sufficiently controllable so that any range of current strength from an almost invisible spark to a heavy flaming one can be obtained.

This method of treatment is particularly applicable to benign growths of the larynx, bladder and rectum, and to such conditions as pterygium, trachoma, moles, keratoses, papillomas, small epitheliomas of the skin, and leukokeratosis of the mouth.

ELECTROCOAGULATION

The term electrocoagulation should be distinguished from electrodesiccation, for the technic and the effects are different. Electrocoagulation is produced by a bipolar high frequency current of the d'Arsonval type. The current used will vary, according to the destruction desired, between 200 and 2,500 milliamperes. The current is much more intense than that generated in electrodesiccation. A current of higher amperage is used.

A cambric needle is employed as in desiccation. For use in cavities such as the mouth, rectum or vagina, a long needle or a pointed wire covered with rubber insulation to within one-half inch of the tip is employed. The inactive electrode consists of a metal plate or a specially constructed moist pad about 8 by 12 inches in diameter, placed under the back or the buttocks. It should be carefully molded to the form to prevent sparking and a consequent burn at the point of unequal contact. The metal parts, in the case of the moist electrode, are covered with several layers of gauze or, better, asbestos paper covered with a linen cloth. The entire pad is moistened and placed in a moistened pillow case. The back of the patient should be insulated by rubber sheeting from the operating table, which for some types of apparatus should be made entirely of wood.

The needle is inserted into the tissue after a preliminary testing of the strength on a piece of metal. In treating large growths, a line of coagulation, evidenced by whitening of the tissue, should be thrown around and beneath the growth to prevent lymph and blood metastasis. After destruction, the tumor should be curetted away.

Experience alone will enable one to judge how far destruction should be carried. This usually goes beyond the area of white coagulation, and care must therefore be exercised or else excessive sloughing may take place.

Electrocoagulation is of superior value in the treatment of accessible malignant growths. Its advantage over the knife in many conditions is that it seals the lymph and blood channels and thus prevents the migration of cancer cells. In cancer of the tongue, for instance, it is distinctly superior to surgical ablation. By the use of this method, fortified by the employment of radium or roentgen rays, decidedly better results are being achieved. According to Clark and his associates, electrodesiccation produces under the microscope dehydration and desiccation of epithelial cells with consequent shrinking. Electrocoagulation produces an actual coagulation of the tissue proteins into a homogeneous cell mass.

TREATMENT BY REFRIGERATION

Liquid Air.—This substance has been used in the treatment of certain diseases of the skin. The difficulty of obtaining and, more particularly, of preserving it has greatly restricted its use.

Carbon Dioxide.—Solid carbon dioxide was introduced by Pusey of Chicago as a substitute for liquid air in the treatment of diseases of the skin.

Refrigeration of the skin with carbon dioxide produces an inflammatory action varying in intensity according to the duration of contact of the freezing agent and the degree of pressure employed. The resulting traumatism may vary from an evanescent inflammatory reaction to necrosis of the tissue treated. The degree of pressure exerted determines the depth of the freezing. The most important factor in inducing the tissue changes is the duration of the refrigeration. The usual period of application is from ten to forty-five seconds.

This treatment gives beautiful results in raised angiomas of moderate size, but does little good in "port wine" stains. It is also valuable in hypertrophic nevi, in keratoses, and in the quiescent stage of lupus erythematosus. The carbon dioxide pencil is formed from the rapidly freezing gas permitted to escape in a glove-finger or similar device from a cylinder of carbon dioxide gas.

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

W. A. PUCKNER, SECRETARY.

BROMURAL. — $(CH_3.CH(CH_3)CHBr.CO)HN.CO.NH_2$.—2-monobromisovalerylurea, obtained by the interaction of urea with bromisovaleryl bromide.

Actions and Uses.—Bromural is a nerve sedative which produces sleep in mild cases of insomnia without markedly affecting the circulation or respiration. All action by bromural is said to cease after from three to five hours. In many cases, however, the sleep caused by the preparation continues beyond the limits of its action. It is claimed to be useful as a nerve sedative and for the purpose of inducing sleep in functional nervous disease. Bromural is not effective in cases of insomnia associated with pain, cough, angina pectoris or delirium.

Dosage.—As a nerve sedative, 0.3 Gm. (5 grains), three times daily; as a hypnotic at bedtime, 0.6 Gm. (10 grains), which dose may be repeated if advisable during the night, after the action of the first dose has ceased.

Manufactured by E. Bilhuber, Inc., New York, by license of the Chemical Foundation, Inc. U. S. patent 914,518 (March 9, 1909; expired). U. S. trademark 61,165.

Bromural Tablets, 5 grains (0.3 Gm.).

Bromural forms small, white, almost tasteless needles which are easily soluble in hot water, ether, alcohol and alkalis, but less readily in cold water. It sublimes on heating and melts at from 147 to 149 C.

Bromural can be precipitated from a 10 per cent sodium hydroxide solution with acids. The presence of bromine may be demonstrated by fusion with sodium carbonate and potassium nitrate and testing for a bromide with silver nitrate solution. On heating the alcoholic solution of bromural with sodium ethylate for several hours on the water bath, sodium bromide will precipitate. If this is filtered off and the filtrate evaporated, a crystalline mass remains which can be recrystallized from water. This is dimethylacrylic acid, melting at 280 C. If 1 Gm. of bromural is boiled for about one minute with 10 per cent solution of sodium hydroxide, ammonia obtained from the urea will be given off. If the hot liquid is then cooled, acidified with nitric acid and extracted with ether, and the ether evaporated, an oily fluid, 1-brom-isovaleric acid, which has the specific odor of valeric acid, will remain. The biuret reaction cannot be obtained. On melting bromural and adding concentrated sodium hydroxide solution and copper sulphate, no color reaction will take place.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 NORTH DEARBORN STREET - - - CHICAGO, ILL.

Cable Address - - - - "Medic, Chicago"

Subscription price - - - - - - Five dollars per annum in advance

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SATURDAY, OCTOBER 8, 1927

AN ESSAY ON LIVING MATTER

In his classic book on the Principles of General Physiology, the late Sir William M. Bayliss wrote that if he were asked to define life he would be inclined to do as Poinsot, the mathematician, did. The latter, according to a story of Claude Bernard, remarked: "If any one asked me to define time, I should reply: 'Do you know what it is that you speak of?' If he said 'Yes,' I should say, 'Very well, let us talk about it.' If he said 'No,' I should answer, 'Very well, let us talk about something else.'" The great French physiologist himself has said that the living being breaks no concord; it is neither in contradiction to nor struggling against general cosmic forces; far from that, it forms a member of the universal concert of things, and the life of the animal, for example, is only a fragment of the total life of the universe.

Despite such somewhat indifferent generalizations, the physician, like the biologist, coming intimately into daily contact with living organisms and their varied manifestations is prone to speculate on the nature of life and its evolution. This is part of the penalty, it may be said, of having developed an inquiring attitude through the study of science and its manifold problems. The medical inquirer may accordingly find some stimulation from the speculations of an eminent American physician, himself a chemist as well as a devotee of medicine. In an address before the American Chemical Society at Richmond, Va., in April, Victor C. Vaughan [1] differentiated between nonliving and living matter by ascribing to the latter the function of metabolism or "trading in energy." When molecules acquire an increased lability, when their chemism is intensified so greatly that they are able to "drag into their orbits atoms and possibly molecules which have hitherto been beyond their grasp," they tend to become living. But there is no life save in those polymers of amino-acids that we designate as proteins. Even simple proteins are, according to Vaughan, not living. There must be in the living molecular structure a carbohydrate group, thus converting a simple protein into a glucoprotein. With this, Vaughan remarked, we have a battery, and this begins to operate under proper stimuli such as heat, light, electricity or the chemical constituents of something in the medium in which the molecular battery exists. The stimulus is some form of energy. And he quotes the old statement of Allen: "Living matter differs from dead in that the former trades in energy while the latter does not."

The morphologist will not be slow to retort that in all this nothing has been said of form and larger structure; no mention is made of cells with their carefully differentiated cytoplasm and nucleus. Vaughan regards it as necessary to disregard these purely structural manifestations in seeking the origin of life and the nature of living substance. The doctrine of "omnis cellula ex cellula" gives no help here. Even the bacterial body which fails to show the morphologic differentiations that cell structure calls for is not regarded by Vaughan as the simplest form of life. The smallest living structure known today he regards as that entity which has been described and studied in greatest detail by d'Herelle and to which he has given the name of bacteriophage. This living particulate chemical substance is much smaller than the smallest known cell. Thus we are told that it can assimilate in a heterologous medium, transforming a heterologous substance into homologous bacteriophage substance, a substance distinctively its own. With this function of assimilation it also possesses the function of adaptation to changing environment. Furthermore, it possesses the faculties of reproduction and variability. The substance is antigenic, has the chemical constitution of protein, possesses as great and prolonged viability as bacterial spores, and appears to be an electronegative colloid just as are the majority of the bacterial species. The dimensions of the bacteriophage corpuscle are approximately those of the serum globulin micella, its diameter being about 20 millimicrons. The substance appears to be thermolabile, its virulence being destroyed at about 75 C. The protein micella is the colloidal unit. Possibly it is the unit of living matter, and cells are constituted of a union of micellae. The bacteriophage is of about the size of a micella.

It matters little whether or not all these details are accepted as accurate descriptions. The essential feature is that they represent a chemist's conception of what d'Herelle termed the protobe, or first life. The cell then merely represents the "most probable configuration of equilibrium in a protein colloid solution." This would present a minimum of free energy compatible with the total energy. The emphasis on purely chemical factors in life leaves much to be explained. The environment that plays an undeniable and large part in development involves physical as well as chemical agencies. The chemist who ventures to picture how inanimate matter may be awakened to life thinks in

1. Vaughan, V. C.: A Chemical Concept of the Origin and Development of Life, Chem. Reviews **4**: 167 (Sept.) 1927.

terms of a great laboratory. He holds that the lowest forms of life have come into existence through chemical agencies and that environment has been a stronger factor in the evolution of life and in the development of the varieties and species than is commonly believed by the biologist of today.

ABSCESS OF THE LUNG

Abscess of the lung, not an infrequent condition, is always serious. Although it may follow any operation or may be a complication of influenza or pneumonia, it occurs most frequently after tonsillectomy. While thousands of tonsillectomies are done without secondary lung abscess, Moore [1] believes that it develops about once in from 2,500 to 3,000 cases. Much recent research has failed to establish conclusively the mechanism of the onset of this complication of both medical and surgical conditions. Schlueter and Weidlein [2] separate lung abscess into two pathologic types. An abscess of one of these types is caused by infection introduced through the air passages and originates in them. The other type is parenchymatous, and is caused by bacteria transmitted by the blood stream. In the opinion of these investigators, postoperative lung abscess is of the second type and results from embolism. Cutler and Schlueter [3] have done work leading to similar conclusions. D. T. Smith,[4] on the other hand, on the basis of experiments with laboratory animals, offers evidence for the view that aspiration of infected material from the teeth and tonsils is the cause of the greater number of cases of pulmonary abscess. The clinical observation that the right lung is more frequently affected favors the aspiratory theory.

In any event, certain precautions can well be taken before and during operation. When possible, mouth infection should be eradicated before operations are performed. If the operation is one of emergency, antiseptic and cleansing sprays and mouth washes may be used preceding the anesthesia. In order to avoid aspiration of vomited matter, the patient should receive no solid food for at least six hours before an operation. Liquids should be limited to water, tea or coffee without milk or bouillon, and even these should not be given within three hours of the start of anesthesia. If the operation cannot be delayed, and the stomach is thought to contain food, it should be washed out beforehand. As soon as possible after tonsillectomy, the patient should be placed in a lateral position. In addition, suction apparatus might well be used to prevent secretions reaching the trachea. Some operators believe that general anesthesia, with its consequent loss of reflexes and of consciousness, should not be used for this procedure. Abscesses developing during the course of influenza or pneumonia may be multiple. It is quite possible that the old method of poulticing the chest in pneumonia caused such congestion of the pleural blood vessels as to encourage infection of the pleura and empyema. The same is possibly true of the new treatment of pneumonia with diathermy; at least it must be considered a possible cause.

The diagnosis of the location of an abscess, while often determined by physical signs, can be properly studied only by the roentgen ray, and repeated pictures and fluoroscopic examinations will show whether or not the abscess is enlarging or diminishing in size. Conservative and postural treatment should first be the rule, but usually, if the condition is not cured in about three months, surgical help is needed. If the abscess is located deep in a lobe, diagnostic or evacuation puncturing is dangerous, as healthy lung will become infected. If the abscess is near the surface of the lung, bordering on the pleural cavity, aspiration may be both advisable and curative.

According to Miller and Lambert,[5] between 40 and 50 per cent of all cases subsequently will need surgical treatment. They urge the combination of the internist, the surgeon, the skilled bronchoscopist and the roentgenologist in the management of the condition. Such care gives the patient the best chance of cure, and also determines when tentative treatment should cease and surgical treatment begin.

TYPING IN LOBAR PNEUMONIA

The striking and characteristic clinical picture that lobar pneumonia presents has made the disease familiar for many generations both to physicians and to the public. Its specific infectious nature has been recognized for fully half a century. In more than nine tenths of all the cases of lobar pneumonia the pneumococcus is involved, an occasional variant pathogenic micro-organism such as a hemolytic streptococcus or more rarely the influenza bacillus entering into the etiologic rôle. A feature of the study of pneumonia was the differentiation of pneumococci into types based on their capacity to produce specific agglutinins, precipitins and protective substances. Most of the strains encountered in patients with pneumonia represent three fixed types of a highly parasitic nature and now commonly designated as types I, II and III, type IV being designated sometimes as the "waste basket" group because it includes the residual variants.

Of late the desirability of careful differentiation of cases of pneumococcic pneumonia on the basis of the types of etiologic agents concerned with each patient has been stressed vigorously. It has been hoped that such a classification would pave the way for more effective treatment, and notably serum therapy, if the

1. Moore, W. F.: Pulmonary Abscess, J. A. M. A. **78**: 1279 (April 29) 1922.
2. Schlueter, S. A., and Weidlein, I. F.: Postoperative Lung Abscess, Arch. Surg. **14**: 457 (Feb.) 1927.
3. Cutler, E. C., and Schlueter, S. A.: The Experimental Production of Abscess of the Lung, Ann. Surg. **84**: 256 (Aug.) 1926.
4. Smith, D. T.: Experimental Aspiratory Abscess, Arch. Surg. **14**: 231, pt. 2 (Jan.) 1927.
5. Miller, J. A., and Lambert, A. V. S.: Treatment of Abscess of the Lung, Am. J. M. Sc. **171**: 81 (Jan.) 1926.

distinct strains of pneumococci exhibit specific immunologic reactions. Some progress has been made in this direction, but thus far knowledge of the possible correlations between the type of pneumococcus in any case and its clinical manifestations and complications has remained rather scanty. Recently the unique opportunities afforded by a large municipal institution, Bellevue Hospital in New York, have been utilized by Cecil, Baldwin and Larsen[1] to secure information on a large scale. The records of more than 2,000 patients with lobar pneumonia, including persons of the most varied races, nationalities and ages, have been utilized.

In the incidence of the various strains of pneumococci, type I tends to preponderate. Young persons are particularly prone to infection with it, whereas type II is more common in elderly persons. By far the commonest mixed infection was that of the pneumococcus in association with the influenza bacillus. The pneumococcus and hemolytic streptococcus is the next most frequent combination. The type of pneumococcus appears to bear no relation to the lobe involved or to the extent of the infection. Three and four lobe infections are as relatively frequent in the milder types (I and IV) as in the severe types (II and III). Pneumococcus type I pneumonia has a low death rate, presumably because it is the pneumonia of young people. Pneumococcus type III pneumonia has a high death rate, chiefly because of its prevalence in elderly people. The relation of bacteremia to death rate was striking in all four types. Among 240 patients whose blood remained sterile, the death rate was only 18.7 per cent; among eighty-nine patients whose blood cultures were positive, the death rate was 83.1 per cent. The association of some systemic disease with pneumonia increases the death rate. Empyema was the commonest complication, occurring in 5.1 per cent of all cases. The incidence of empyema was considerably higher in type I infections than in any of the other types. Empyema is a much more serious complication when it develops during the active stage of pneumonia than when it occurs after the crisis.

The foregoing are a few of the statistically determined features of typed pneumonias. The Bellevue observers assert that the fact that the various types of pneumonia possess certain characteristics that differentiate them from one another serves to emphasize the importance of the bacteriologic study in every case. The time has come, they argue, when every case of lobar pneumonia should be typed. Knowing the type of pneumonia with which he is dealing, they add, the physician at once knows a good deal more about his patient, his chances of recovery, the danger of complications and the feasibility of specific treatment. For these reasons, an exact knowledge of the bacterial nature of the infection has become an indispensable requisite in the treatment of a pneumonic patient.

1. Cecil, R. L.; Baldwin, H. S., and Larsen, N. P.: Lobar Pneumonia: A Clinical and Bacteriologic Study of Two Thousand Typed Cases, Arch. Int. Med. **40**: 253 (Sept.) 1927.

Current Comment

GRADUATE STUDY ABROAD IN GROUPS

Physicians returning from individual graduate study abroad are urgently advising Americans against joining personally conducted tours for graduate study in Europe. The main objection to such groups is that the work is crowded through in such a manner that the individual cannot possibly comprehend it even though he works, as some do, from 7 o'clock in the morning until 10 at night, carrying sandwiches in his pocket for meals. In cadaver work two physicians may properly be assigned to a cadaver, with an instructor who demonstrates the anatomy and the method and then has each physician perform the operation. Under the group method, however, sometimes as many as six or seven persons are put on a single cadaver, thus making it impossible for each to do individual work. Physicians seeking graduate medical education abroad, therefore, can secure better results as individuals and at more reasonable charges. In some of the groups physicians have been charged $400 for services generally furnished to any individual for as low as $125. As individuals, also, physicians can secure full information and valuable advice by acting through agencies which have been established for the special purpose of cooperating with American physicians. The American University Union has headquarters in London and Paris. There is the so-called American Medical Association of Vienna and a similar organization at Budapest. At Berlin there is the Amerika-Institut. Through these organizations it is stated that charges for courses are maintained at a fair figure. Through these agencies also an American physician can make arrangements to the best advantage although, of course, his chances are better if he is familiar with the foreign language. The science of medicine should not be exploited for the benefit of medical impresarios or to provide three ring clinical circuses for sensation-seeking spectators.

EFFECTS OF LACK OF SLEEP

The long recognized importance of functional disorders of the nervous system in the human being, particularly in cases that produce nervous exhaustion, with insomnia, has stimulated some recent research on the problem at the University of Wisconsin Medical School.[1] The investigators devised a means of producing in rabbits the simplest type of fatigue; namely, lack of sleep. The animals were placed in cylindric cages so mounted that they could be rotated continuously. Rate of rotation was adjusted so that the rabbits were forced to change position about eight times a minute. Usually the movement consisted of the animal taking a leisurely step forward. This arrangement reduced to a minimum the factors of physical exertion and muscular fatigue. Food and water were

1. Bast, T. H., and Loevenhart, A. S.: Studies in Exhaustion Due to Lack of Sleep: I. Introduction and Methods, Am. J. Physiol. **82**: 121 (Sept.) 1927. Leake, C.; Grab, J. A., and Senn, M. J.: II. Symptomatology in Rabbits, ibid., p. 127. Bast, T. H.; Schacht, F., and Vanderkamp, H.: III. Effect on the Nerve Cells of the Spinal Cord, ibid., p. 131. Bast, T. H., and Bloemendahl, W. B.: IV. Effects on the Nerve Cells in the Medulla, ibid., p. 140.

so placed as to be always available, and rotation was continued until the animals collapsed or died. Studies were made on the symptomatology of exhaustion. The length of life varied from seven to thirty-one days. Meanwhile, weight decreased progressively. In the early days of the experiment, the pulse rate and body temperature tended to rise. Symptoms which appeared, as collapse and death became imminent, were sudden drop in temperature, and increase in pulse rate, followed by a sudden marked decrease and gradual slowing of the respiratory rate. Studies of the cellular changes in the spinal cord were made immediately after death. The chromatin material of the nuclei was found to be decreased. Chromatolysis was noted and was characterized by granular Nissl bodies or diffuse granulation throughout the cytoplasm. Furthermore, vacuoles were found in the cytoplasm, in a zone midway between the cell wall and the nucleus. These and other microscopic changes were found also in the nerve cells of the medulla. As Bast and Loevenhart point out, studies of this sort are necessary to an appreciation of the relations between underlying structural changes and the clinical picture of "nervous breakdown." Added information, also, may be made available for evaluating the factor of nervous exhaustion which is present in acute and chronic disease.

PECULIARITIES OF EXTERNAL ELECTRICAL LESIONS

The tremendous expansion of the use of electricity in industry and in the home has made electrical shock and "burns" a common form of injury. The changes of the skin produced by the electric current are peculiar. Most frequently the lesion is round, but it may be elliptic or roset-like, or correspond in outline to that of an object in contact with the skin at the point at which the current enters. The typical color of this electrical mark is a pale yellow. There may be no redness or inflammatory change about the necrotic area, which is not painful and which may remain without much if any obvious change for several weeks, when separation may take place either in mass or a little by little, without the formation of pus. The resulting scar is soft and vascular. It is noteworthy that the hairs in and near such areas are not necessarily burned; there may be twists of the hair or constrictions at regular intervals. In fowls, feathers may react to the electric current in a similar manner. In view of its nature it does not seem appropriate to refer to this lesion as an electrical "burn," which is the common designation. Cases of electrical injury do occur, however, in which actual burns develop. As healing of electrical lesions takes place, it frequently becomes apparent that the injury to the tissues is much greater than at first indicated. Muscles, tendons, bones or blood vessels may turn out to be affected. It is particularly important to know that the blood vessels may be weak and rupture easily during the first few weeks after electrical injury, and for this reason the treatment of local lesions must be conservative to an extreme degree. Active surgical measures are rarely indicated and may be a real danger to the patient. New circumstances constantly develop the need of new observations and methods in medicine, the most living of all the sciences, since it is concerned primarily with living human beings.

"VIVISECTION ON TRIAL"

"Vivisection on Trial" is the somewhat misleading title of a readable article by E. E. Free in *Liberty* magazine for October 1. He presents first the case against vivisection as seen by the president of the New York Antivivisection Society, a Mrs. Diana Belais. The case for animal experimentation is then stated from the point of view of the managing director of the American Association for Medical Progress, Dr. B. C. Gruenberg. The reader is left to decide the case. Unfortunately, the use of the term "vivisection" tends to prejudice the reader, as it carries the idea of cutting and other painful operations, which today are minor factors in animal experimentation. The use of the terms "cruel" and "cruelty," in stating Mrs. Belais' case tends to produce further prejudice and is a mere begging of the question; for cruelty imports pain inflicted for no justifiable purpose, and the very question the reader is asked to decide is whether such pain as is incident to animal experimentation is or is not justified by the results accomplished and the ends sought. Such criticisms as these, however, do not detract from the value of what manifestly aims to be an unbiased presentation of the subject to the lay reader.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

Beauty Specialist Violates Practice Act.—Adele Millar, Los Angeles, whose advertisements as a beauty specialist are said to be well known to Sunday newspaper readers, recently pleaded guilty to a charge of violating the medical practice act, and was sentenced to pay a $100 fine or serve sixty days in jail. The sentence was suspended for two years on condition that she does not violate the state medical law during that time.

Dr. Faull Cited to Appear Before State Board.—Dr. Carleton W. Faull has been cited to appear at the October meeting of the California State Board of Medical Examiners to show cause why his license to practice should not be revoked. It was necessary for the board to serve the citation by publication, as Dr. Faull disappeared following his reported activities with two street fakers in Oakland and their nostrums "Zan" and "Arlo Balm."

Course in Mental Measurement.—The extension division of the University of California announces a course in mental measurement intended especially for teachers. It will consist of two parts of fifteen assignments each, and one unit of university credit will be given for each part when completed. The course is to be supplemented by weekly radio talks over KGO which, although not required, are recommended as of great assistance in this work. The fee for the course is $7.

"Dietetic Philosopher" Arrested.—Albert Carter, special agent for the state board of medical examiners, arrested Burton C. Platt, so-called dietetic philosopher, in August for violation of the medical practice act. Platt, at the time of his arrest, was building an old-fashioned whole wheat mill where the flour is to be ground between slowly revolving stones. He pleaded guilty at Riverside and was fined $250,

the sentence being suspended on condition that he does not again violate the medical practice act in Riverside County for two years. Platt promised that he will confine his efforts to the manufacture and sale of food products, and that he will not examine or treat patients.

"Dr." Malchenson Disappears with Midwife's Certificate.—Mollie Newkrug, Los Angeles, who, some months ago, was sentenced for violation of the medical practice act, recently met a "Dr." S. D. Malchenson who, it is reported, induced her to promise to marry him. Malchenson was to obtain a physician's license and Mrs. Newkrug, who is said to be a midwife, could then work under his supervision. Malchenson obtained from his fiancée about $700, supposedly to be used to equip his office, about $100, so that he could apply for a state license, and $40 to rent an apartment at Alhambra. He paid half a month's rent, then disappeared. His business card read, in part: Dr. S. D. Malchenson, physician and surgeon, 921 Maryland Avenue, Cumberland, Md.; supreme court physician of subcourt Cumberland, number 4931. By appointment only. The California State Board of Medical Examiners wired the police of Cumberland, and were informed that Malchenson, when he was there about a year ago, was known as a physiognomist. He wrote the state board of California about a license by reciprocity, but had not filed his application up to July 18. He not only left Mrs. Newkrug practically without funds, but also took with him her New York midwife's certificate.

COLORADO

Licenses Revoked.—The state board of medical examiners revoked the license of Dr. Noble O. Hamilton, Denver, July 5, after the district attorney's office had found him guilty of performing abortions. Hamilton is now serving another term in the state penitentiary. His license was revoked, July 6, 1916, for the same reason, and he then served in the penitentiary several years. Following this experience, his license was restored to him, Jan. 2, 1923. It has again been revoked. The state board also revoked the license of Dr. William Frye for unprofessional and dishonorable conduct. Frye is said to have associated himself with an advertising office in Denver where he was the re-fee.

IDAHO

Personal.—Dr. Ralph M. Fouch, Boise, resigned as adviser to the state department of public welfare, effective September 30, and will open a hospital at Huntington, Ore.——Dr. Frank W. Mitchell has resigned as superintendent of the Idaho Insane Asylum at Blackfoot. Dr. Mitchell has been the superintendent since March, 1924.——Dr. Hugh P. Ross, Nampa, was made president elect of the Idaho State Medical Association at the annual meeting, Twin Falls, August 29-31, and will succeed Dr. Alexander Barclay, Coeur d'Alene, as president at the expiration of his term, Jan. 1, 1929.

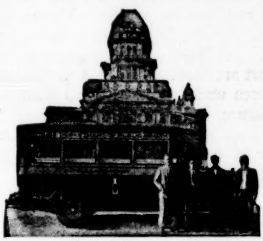
ILLINOIS

Society News.—The fall meeting of the National Academy of Sciences will be held at the University of Illinois, Urbana, beginning October 18, and the executive committee of the American Association for the Advancement of Science will meet in Urbana, October 16. The state geologists of the country are to assemble in Urbana, October 20, for a three days' field trip under the direction of the geologists of Illinois.——Dr. Alexander S. Hershfield, Chicago, state alienist, addressed the consulting staff at the state hospital at East Moline, September 5.——Dr. Albert M. Shaw, Adrian, addressed the McDonough County Medical Society, September 7, Macomb, on "Free Clinics."

Itinerant Quack Indicted—Baldness an Issue.—Dr. Wilbert Shallenberger, who has long been an itinerant quack, was indicted by the Bureau County Grand Jury, September 9, it is reported, charged with violation of the state medical practice act and with obtaining money under false pretense, and was held under $5,000 bond. Mrs. Lydia Huesman, Walnut, is said to have charged that Shallenberger treated her son, who was bald, for twenty-two months at the rate of $37 a month, and that her son did not improve. Mrs. Huesman also charged that her daughter was treated by Shallenberger for seventeen months at the rate of $15 a month, with about the same results. Shallenberger's previous quackish activities are described in the pamphlet "Men's Specialists," issued by the American Medical Association.

Semicentennial Celebration of Health Department.—The state department of public health will celebrate at Springfield, October 13-14, its semicentennial. The presiding officers at the meeting will be the president of the state medical society, Dr. G. Henry Mundt, Chicago; the chairman of the council of the state society, Dr. William Chapman; the state health officer, Dr. Isaac D. Rawlings, Springfield; Dr. Edwin P. Sloan, Bloomington, and Dr. Frank L. Rector, Chicago. The celebration will occur jointly with the annual conference of local and state health officers; among the speakers will be Drs. Haven Emerson, New York; William A. Evans, Roy R. Ferguson, Benjamin Goldberg and Samuel S. Winner, all of Chicago; Harry G. Irvine, Minneapolis; Edward Francis, U. S. Public Health Service, Washington, D. C., and John J. McShane and George D. Heath, Jr., Springfield. A history of public health service in Illinois will be distributed. Invitations have been issued to physicians and public health workers generally.

Mobile Milk Laboratory.—The arrangement and equipment of the new mobile milk laboratory of the state department of health is said to be among the best in the country. It is built in a twenty-one passenger street-car-type motor bus with laboratory benches and other equipment in place of the seats. There is a central aisle between the benches, one of which is 12 feet long, the other 9, ample cabinet space and drawer space for supplies, an enameled sink with running water, gas, compressed air, steam and hot air sterilizers, an incubator, and a milk grader heated by electricity. The windows are equipped with fine mesh screens. The car can be heated by two floor heaters operated on the engine exhaust. The laboratory will visit pasteurization plants to make analyses to determine the quality of raw milk coming from the plant, and to advise the plant owners on equipment, procedure and methods. There are 352 pasteurization plants in Illinois, located in 153 cities. The personnel of the laboratory normally will be two sanitarians and a milk bacteriologist. They will be able to make such tests as bacterial counts, tests for acidity, sediment and temperature, and analyses of cleaning solutions and wash water to determine their effectiveness.



Chicago

Annual Dinner Postponed.—The officers of the Chicago Medical Society have decided to postpone the annual dinner which had been announced for October 19, until such time as the clubrooms in the new Medical and Dental Arts Club are available; this, it is said, will be in the near future.

Personal.—Dr. Irving Cutter, dean and associate professor of medicine, Northwestern University Medical School was guest of honor, September 20, at the opening of the annex to the Illinois Masonic Hospital.——Theodore Koppanyi, Ph.D., formerly of the department of physiology of the University of Chicago, assumed the duties of assistant professor of pharmacology at the College of Medicine of Syracuse University, Syracuse, N. Y., October 1.——Dr. Ludvig Hektoen addressed the Massachusetts Medicolegal Society, Boston, October 6, on "Biologic Tests in Forensic Medicine."

Meeting of National Committee for the Prevention of Blindness.—The annual conference of this committee will be held at the Stevens Hotel, October 13-15. There will be joint meetings with other societies as noted in THE JOURNAL (September 17, p. 977, and October 1, p. 1157). Among the speakers at the various meetings will be:

Dr. Albert J. Chesley, St. Paul.
Dr. Edward L. Cornell, Chicago.
Dr. Don M. Griswold, Lansing, Mich.
Dr. John Green, Jr., St. Louis.
Dr. William L. Benedict, Rochester, Minn.
W. T. Bovie, Ph.D., Chicago.
Walter G. King, Chicago.
E. C. Crittenden, Washington, D. C.
Lewis H. Carris, New York.
C. E. Feree, Bryn Mawr, Pa.
Gertrude Rand, Bryn Mawr, Pa.
P. W. Cobb, Cleveland.
F. K. Moss, Cleveland.
Charles Sheard, Ph.D., Rochester, Minn.
Dr. William H. Wilder, Chicago.
Dr. Edward V. L. Brown, Chicago.
Dr. Benjamin Franklin Royer, New York.
Frank G. Bruner, Ph.D., Chicago.
Dr. Paul D. Mossman, U. S. Public Health Service.
Dr. Cornelius A. Harper, Madison, Wis.
Dr. Charles F. Wilinsky, Boston.

Safety Demonstration.—In connection with the annual meeting of the National Safety Council in Chicago, September 26-30, a pageant of safety was held in Soldier's Field, Grant

Park, October 5. The mayor issued a proclamation designating this day for reflection on methods for the prevention of accidents, urging every municipal department, industry and civic organization to participate. There was a parade by the high school pupils who take military training, the city officials, and the safety patrols from the public and parochial schools. There were floats, a skilful driving demonstration by chauffeurs, a life saving exhibition by the police department, and a demonstration by the Chicago Fire Department. The object was to focus attention on the prevention of accidents.

INDIANA

Hospital News.—Ceremonies were held, August 21, at Kendallville to dedicate the new Lakeside Hospital, toward which the citizens pledged $52,000; Mr. E. E. McCray gave $50,000. ——Southern Indiana Hospital for the Insane, Woodmere, is being enlarged by the addition of three story wings which will accommodate about 300 additional patients, making the total capacity about 1,800.——Dr. David L. Smith, Indianapolis, addressed the Muncie Academy of Medicine, September 9, on "Rectal Anesthesia in Obstetrics."

Milk Control Program.—The state board of health has planned a milk control program whereby all dairies and milk supply depots in the state will be closely inspected in order to lessen the danger of typhoid, the death rate of which in Indiana is said to be very high. Additional milk inspectors have been added to the staff of the state board in order that this program may be carried out. A state-wide milk survey has been made. It appears that pasteurization is on the wane in cities of from 1,000 to 5,000 inhabitants. They do not generally have pasteurizing plants, figuring that the size of the population does not justify the necessary investment. There are 135 cities in this group, with a combined population of about 276,000. Only 34 per cent of the milk supply is pasteurized, the remainder is raw tuberculin tested milk. These cities obtain their milk from about 530 dairies and plants. A new feature is evident, the state board of health says, in this group of cities. Some of the central plants do not pasteurize, and in some no treatment of any sort is given; others clarify or filter before selling. While milk ordinances have been passed in fourteen cities, not one has a sanitary officer or milk inspector whose duty is to enforce the ordinance. In the group of cities of from 5,000 to 10,000 population, it was found that 63.5 per cent of the milk was pasteurized.

KENTUCKY

Infantile Paralysis Closes Schools.—The schools in Owensboro and others in Daviess County were reported temporarily closed, September 26, in order to prevent the further spread of infantile paralysis. The quarantine is intended to keep children under sixteen years of age away from schools, theaters, churches, stores and other public places.

MARYLAND

Meeting in Memory of Lister.—The Johns Hopkins Medical Society will open its academic year, October 10, by a meeting dedicated to the memory of Lord Lister. Dr. John Stewart, dean and professor of surgery, Dalhousie University Faculty of Medicine, Halifax, will be the principal speaker. Professor Stewart was senior house officer under Lister in London. Other speakers will be Dr. William MacCallum, Baltimore, a delegate to the centenary celebration in London of Lister; Dr. Eli K. Marshall, Jr., Baltimore, who will speak on "Lister's Contributions to Physiology," and Dr. William W. Ford, Baltimore, who will speak on "Lister's Contributions to Bacteriology."

Community Health Day.—The Medical and Chirurgical Faculty of Maryland has set aside October 24 as community health day, and has appointed a committee to arrange for its proper observance with the idea of stimulating interest in the prevention and cure of disease in the community. Health day will open with clinics at Johns Hopkins Hospital and the school of hygiene and public health and at the University of Maryland, which will be given by foreign guests. There will then be an informal luncheon at the Hotel Belvedere, where the work of the state board of health and rural health problems will be discussed. Next there will be a public health meeting at which the feasibility of establishing systematic courses in hygiene in the primary schools will be considered, as well as suggestions as to how to disseminate health information among the public. The formal dinner will be held in the evening at the Hotel Belvedere, when city health problems will be discussed. The semiannual meeting of the Medical and Chirurgical Faculty will follow the next day at Hagerstown.

Physical Examination of School Children.—The deputy state health officer assisted by public health nurses will soon again undertake the physical examination of school children, focusing their efforts this year to reach every child in the first three grades. The children who were examined last year, those who were referred to physicians by the teachers and the older children needing medical attention will not be neglected. The object of the examination is to discover conditions that may be corrected, and in all cases parents will be notified of conditions that need correction, as they were last year when 33,000 children were examined. It is said that as a result of the continuous supervision of the health of school children, the number of children known as repeaters has been decreased in the last ten years from 49 per cent to 23 per cent, while the number of absences on account of sickness has also been decreased. The assistant director of the state health department, Dr. Robert H. Riley, will be in charge, assisted by the deputy state health officers and the public health nurses.

MASSACHUSETTS

Society News.—About seventy members of the Massachusetts Psychiatric Society and the Boston Society of Psychiatry and Neurology gave a dinner, August 30, at the University Club, Boston, in honor of Dr. Bernard Hart, the English psychiatrist. The toastmaster was Dr. Abraham Myerson, president of the Massachusetts Psychiatric Society.

Shin Beef and Rinds for Frankfurts.—The Boston Department of Health discovered about 6,000 pounds of meat in a frankfurt plant which it was necessary to condemn on account of decomposition. None of the meat had been in the plant less than a week, and some much longer. It consisted of shin beef, pork trimmings, veal and rinds, and was intended to be made into frankfurts. Although the meat in the center of all the barrels was "gassy," evidently in a state of decomposition, it could have been spiced and treated, so that only experts could detect the odor. It was all taken to a rendering plant.

Dr. Hill Honored.—At the annual outing of the Plymouth County Medical Society, Plymouth, recently, Dr. Edgar Dwight Hill of that city was presented with a purse of gold in recognition of his fifty years in the practice of medicine. A scientific meeting was held at the Jordan Hospital; the speakers were Drs. Francis D. Donoghue, John P. Adams, Delbert L. Jackson and Halsey B. Loder, all of Boston. The secretary of state, representing the commonwealth, gave an address; Dr. John M. Birnie, Springfield, president of the state medical association, and others were on the program.

MICHIGAN

"Dr." Jackson Leaves Bad Checks at Ann Arbor.—The "Dr." C. R. Jackson who left worthless checks in Detroit a few days ago visited Ann Arbor, September 21, representing himself as a kidney specialist, and stating that he intended to take special work at the university. He cashed worthless checks at two drug stores and left town. (THE JOURNAL, October 1.)

MISSISSIPPI

Society News.—At the North Mississippi Medical Society meeting, August 24, Water Valley, Dr. James K. Avent, Grenada, among others, spoke on "Spinal Anesthesia in Major Surgery," and Dr. Robert L. Sanders, Memphis, "Principles in the Management of Gastric Lesions."——Dr. John Darrington, president of the state medical association, Yazoo City, among others, addressed the September 13 meeting of the Tri-County Medical Society, Brookhaven, on "Our Plans and Policies," and Dr. James M. Dampeer, Crystal Springs, on "Why a County Health Unit in Every County."——Among others, Dr. Charles J. Bloom, New Orleans, addressed the South Mississippi Medical Society, New Augusta, September 8, on "Birth Injuries"; Dr. Lawrence B. Hudson, Hattiesburg, "Duodenal Ulcer," and Dr. Joseph E. Green, Richton, "Infant Feeding."

MISSOURI

Missouri Admitted to Birth Registration Area.—For the first time since the vital statistics law was adopted in 1909, the state of Missouri was admitted to the U. S. Birth Registration Area, September 8. On two previous occasions it has failed to be admitted because a check by the census bureau failed to show that at least 90 per cent of the births had been recorded.

Disaster—**St. Louis Tornado.**—A tornado suddenly visited St. Louis about 1 p. m., September 29, devastating an area of several square miles through residential and business districts, damaging property estimated at about $15,000,000, causing the death of eighty-nine persons and the injury of many more and rendering thousands homeless. It is possible that the number known killed will increase as wreckage is cleared away. The Missouri National Guard and regular army troops from Jefferson Barracks are patrolling the storm area, and a relief fund is being subscribed. The Red Cross declared, October 1, that those in need had been taken care of.

Personal.—Dr. Evarts A. Graham, professor of surgery, Washington University School of Medicine, St. Louis, has been selected to deliver the Shattuck Lecture before the Massachusetts State Medical Society at Boston, in 1928.——Dr. Milton P. Overholser, Harrisonville, took charge of state hospital number 2 at St. Joseph, September 1, succeeding Dr. James H. Parker, who was appointed superintendent of State Hospital number 3 at Nevada. Dr. Parker succeeds Dr. James W. Bruton, who resigned on account of ill health. Dr. Overholser was formerly a member of the state board of health.——Dr. Glenn C. Carbaugh has been appointed chief deputy coroner of Kansas City, succeeding Dr. Charles S. Nelson, who resigned to do postgraduate work in Europe.

Meeting of Social Workers and Physicians.—During the regional conference on social hygiene sponsored by the Kansas City Social Hygiene Society, there will be a dinner meeting, October 11, 6:30 p. m., Hotel President, limited to the members of the Jackson County Medical Society and visiting physicians, and following the dinner a joint meeting of the Jackson County Medical Society and the American Social Hygiene Association. Dr. Edward L. Keyes, professor of clinical surgery, department of urology, Cornell University Medical College, New York, will discuss "Clinical Progress in the Treatment of Venereal Diseases," and Dr. Oliver C. Wenger, director, Venereal Disease Clinic, Hot Springs National Park, Ark., U. S. Public Health Service, "Social Hygiene and Public Health." The presiding officer at this meeting will be the president of the Jackson County Medical Society, Dr. Clyde O. Donaldson, Kansas City. At another session of the conference, Dr. Martin F. Engman, St. Louis, will discuss "A Physician's Part in Social Hygiene"; Dr. George Leonard Harrington, Kansas City, "How Psychiatry Contributes to the Girls' Problems," and Dr. William F. Snow, New York, "Résumé of Report to League of Nations."

NEBRASKA

Personal.—Dr. Allen T. Rice, Beatrice, celebrated his ninety-second birthday, recently.——Dr. and Mrs. Zacheus L. Kay, McCook, celebrated their golden wedding anniversary, July 15, 1927.——About eighty-five persons attended the July dinner of the Madison "Four Counties" Medical Society held at Orchard.——The Elkhorn Valley Medical Society held its annual meeting at Norfolk, August 3, electing Dr. Arthur E. Cook, Randolph, president, and Dr. Edward L. Brush, Norfolk, secretary. Dr. Peter H. Salter held a bone clinic at the Norfolk General Hospital, the staff of which also reported on the further treatment of sixteen cases of general paralysis by malaria. The papers read at the evening session were by Dr. Cook on "The Country Doctor" and by Dr. John E. Summers, Omaha, on "Significance of Modifications of Pulse and Temperature."

NEW YORK

Towns Without Physicians.—The district state health officer reports to the state health department that the only physician in Western, Oneida County, has moved to another community, leaving not only that community but the surrounding towns of Ava, Lee, Steuben and Floyd without convenient medical service. The health officer considers that an active physician would find this locality suitable for the development of a large practice, as it covers a large territory. Further details will be given by the district state health officer, Dr. Halsey J. Ball, 512 Plant Street, Utica.

Society Reiterates Stand on Demonstration.—Since the Cattaraugus County Medical Society expressed a desire to have the Milbank Demonstration withdraw at the close of this year, newspaper comments have been made which might be construed as inferring that the acts of the officers and committee were not in accord with the desires of the society itself. Therefore, the society unanimously passed a resolution, September 20, recording confidence in its officers and its committee on public health and public relations. At this meeting, preliminary figures on a poll to determine the attitude of the physicians throughout the state indicated that the sentiment of physicians generally in New York was overwhelmingly in support of the Cattaraugus Society. The number of members present at this meeting was twenty-five, in addition to guests from the neighboring county of Allegany. Dr. Walter A. Calihan, Rochester, read a paper on "Gallbladder Surgery."

New York City

Dr. Williams Remains at Teachers College.—THE JOURNAL published an item, September 17, stating that Dr. Jesse F. Williams had resigned as professor of physical education at Teachers College, Columbia University, to become medical adviser to Scarborough School, New York. Dr. Williams will remain at Teachers College as supervisor of physical education. The report of his resignation probably arose from the fact that he supervised the medical examinations at Scarborough School for a few days before registration at Teachers College began.

Personal.—At a joint meeting of the Newburgh Bay and Orange County medical societies, September 13, Dr. Frank C. Combes, Jr., spoke on "Skin Manifestations of Systemic Disease."——Dr. Max Soletsky of the city department of health returned, October 3, from England and France, where he had been studying the tuberculosis situation, especially the prevention of tuberculosis in infancy by vaccination.——Dr. John A. Hartwell has been chosen a trustee of the New York Academy of Medicine for the unexpired term of the late Dr. Walter B. James.——Frederic A. Woll, Ph.D., will head the department of hygiene of the College of the City of New York, beginning January 1.

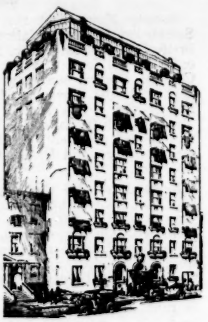
Amount of Infantile Paralysis.—The health commissioner, Dr. Louis I. Harris, is reported to have said, September 29, that the number of cases of infantile paralysis in the city is slightly larger than for the corresponding period last year; the indications are it will decrease with the approach of cold weather. During the week ending October 1, forty-two cases and four deaths were reported, while there were thirty-seven cases and four deaths the preceding week, and for the week ending September 17, fifty-three cases and eight deaths; for the previous week, thirty-nine cases and seven deaths, and for the week ending September 3, sixty-six cases and five deaths. Three new cases were reported October 1, two in Brooklyn and one in the Bronx.

Better Hearing Week.—The New York League for the Hard of Hearing and the otologic section of the New York Academy of Medicine have designated the week beginning October 14 as Better Hearing Week in an effort to inform the public about the prevention of deafness. The program to be presented begins at the academy of medicine, 2 East One Hundred and Third Street, where the auditorium will be wired so that hard of hearing persons may listen with ease to the addresses. Among the speakers the opening night will be Dr. Arthur J. Cramp, Chicago, director, Bureau of Investigation of the American Medical Association, and Mrs. William B. Maloney. The New York League for the Hard of Hearing will hold open house at its headquarters, 126 East Fifty-Ninth Street, during the week. There will be an exhibition at the health shop of the Harlem Health Center, 345 East One Hundred and Sixteenth Street; well known otologists will broadcast daily, October 15-19, and addresses will be made in the public schools, October 17. Better hearing week will culminate in a luncheon at the Hotel Commodore, October 21, the speakers being William J. O'Shea, superintendent of schools; Dr. Iago Galdston of the New York Tuberculosis and Health Association; Harvey Fletcher of the Bell Telephone Laboratories, and George J. Hecht, editor of *Children*.

Delinquency in Harlem.—An investigation of delinquent and neglected negro children in New York City has been made by the Joint Committee on Negro Child Study in cooperation with the Women's City Club of New York and the National Urban League. The report covers the five boroughs of New York and the several centers of congested negro population. It appears that since 1919 there has been an increase in the delinquency and neglect of negro children and a decrease in delinquency among white children. The proportion of delinquent and neglected children in Harlem is four to six times as great among the negro as among the white population of New York. The negro population of New York has increased nearly four times as fast in the last ten years as has the general population. There are now more than 200,000 negroes in the city. Harlem, the home of

jazz and night clubs, the report says, is in reality a place where overcrowding and lack of noncommercial recreational facilities is breaking up the family life of the negro. Whereas in the juvenile court, the most common charge against white boys is stealing, that against negro boys is disorderly conduct. Negro boys brought into court for delinquency in 1925 outnumbered the girls three to one. The contributing causes of delinquencies among negro children were found to be a lack of opportunity for supervised recreation, lack of parental control due in part to the employment of mothers outside the home, and retardation in school and a resulting tendency to truancy. In about 85 per cent of the cases of delinquency among negro girls, the charge was "ungovernable and wayward" or desertion of home. To correct the conditions found, the committee submitted detailed recommendations, chief of which is the development within the Welfare Council of New York of a committee representing all the committees now working with negroes to coordinate their activities and plan a social welfare program for Harlem and other colored districts. The committee recommends, among other things, an increase in the municipal facilities for play, after-school and summer activities in school buildings, more summer camp facilities and social centers.

Pan American Hospital Opens.—The directors of the Pan American Hospital, 159-163 East Ninetieth Street, which opens, October 17, will soon launch a campaign for funds to complete the purchase of the building and equipment. The project is sponsored by persons who desire to see a general hospital established to serve the 200,000 Latin Americans in the city. It will be available for patients of moderate circumstances, as well as for those who are destitute, and will be controlled by the Pan American Medical Association which, through component societies in some large cities of this country and in most of the Latin American countries, seeks a mutual understanding between physicians of the Americas, and publishes in Spanish the *Revista Medica Panamericana*. Spanish and Portuguese speaking physicians attending Latin American families may concentrate their work at this hospital. Some beds will be available for the treatment of diseases of women and children, for research in malignant disease and for the development of group diagnosis. The hospital is fireproof, of simple design, and dignified and cheerful within; it will be conducted in accordance with high ideals of service, and not for profit. The first governing board will comprise Drs. William Sharpe, Fred H. Albee, Adoniram J. Quimby, Manuel U. Troncoso, Frederick H. Allen, Clarence J. Owens and Louis R. Wiley, while on the attending staff will be a number of prominent Latin American physicians. The objects of the board of directors are to maintain a general hospital to serve the many Latin Americans in New York, to direct postgraduate courses for Latin American medical students who come to New York, and to have a training school for Latin American girls who may return to their respective countries to aid in improving the nursing situation there.



NORTH CAROLINA

Chiropractors Dislocate Patient's Hip.—A jury in Forsyth County Court has awarded Mr. Dan H. Turner $20,000 in his suit against chiropractors Robert M. and Eugene L. Cox after finding that Turner's hip had been dislocated while taking chiropractic treatments. The suit, started several weeks ago, was for $50,000 damages. The judge overruled all motions to set the verdict aside, and the defense gave notice of appeal to the superior court.

Hospital News.—Five hundred acres of land attached to the state training school for the feebleminded near Kinston have been set aside as a site for the erection of the state farm colony home for training women of an age not deemed advisable for reception at the Samarcand School. The land was set aside on the recommendation of Governor McLean. ——The staff of the U. S. Veterans' Hospital at Oteen entertained about twenty members of the American Society of Obstetrics, Gynecology and Abdominal Surgery, September 16, and was addressed by Professor Strassman, Berlin, Germany, and by Dr. Henry Schmitz, Chicago.

OREGON

Personal.—Dr. Ira A. Manville, associate in physiology, University of Oregon Medical School, Portland, and Dr. Charles U. Moore, Portland, read papers on the effect of prenatal diet on the offspring before the Central Willamette Valley Medical Society, Eugene, September 9.——Dr. Toivo J. Forsstrom was elected president of the staff of Columbia Hospital, Astoria, September 14.

Chinese Herbalist Arrested—Treats Scarlet Fever.—Mr. C. Gee Wo, proprietor of a Chinese medicine shop in Portland, was arrested, September 28, by the state board of medical examiners for practicing medicine without a license. Mr. Wo treated a girl for what he called "skin rash" but which was, in fact, scarlet fever. The patient was sent to the isolation hospital, and Wo was released under $1,000 bail. This was the second time within a week that he had been arrested for practicing medicine without a license and his arrest was the seventh made during September for violation of the public health laws.

PENNSYLVANIA

Veteran Health Board Resigns.—All the members of the Hanover Health Board have resigned their positions, it is reported, effective December 31. Dr. Maurice M. Fleagle, the president, has served nineteen years; F. Y. Stambaugh, the secretary, more than twenty-five years; J. E. Bemiller and Charles Seidenstricker, seven years; William E. Pitts, ten years, and Daniel M. Herbst, fifteen years.

Philadelphia

Jefferson's Freshman Class Selected from 2,500 Applications.—At the opening of the one hundred and third session of Jefferson Medical College, September 21, Dr. Edward A. Strecker, professor of nervous and mental diseases, gave the address. The total enrolment this year will be about 600 students, representing nearly every state and many foreign countries. The freshman class of 178 students, it is reported, was selected from 2,500 applications. Dr. Virgil H. Moon of the University of Indiana School of Medicine, Indianapolis, and Dr. Jacob Earle Thomas, formerly of West Virginia University School of Medicine, Morgantown, and St. Louis University School of Medicine, have been added to the Jefferson faculty as professor of pathology and professor of physiology, respectively.

Additions to Faculty of Woman's College.—The following additions to the faculty of the Woman's Medical College of Pennsylvania have been reported:

Helene C. Wilson, Ph.D., associate in pharmacology.
Margaret Sumwalt, B.S., associate in physiology.
Dr. Frances J. Heath, teaching fellow in obstetrics.
Cecilia Riegel, Ph.D., instructor in physiologic chemistry.
Dorothy E. Bateman, Ph.D., Colgate Research Fellow in Chemistry.
Dr. Asta J. Witner, instructor in obstetrics.
Dr. Ann C. Arthurs, instructor in clinical otolaryngology.
Dr. Samuel B. Hadden, instructor in clinical neurology.
Dr. Mary J. McIlvaine, instructor in clinical obstetrics.
Coletta A. Bennett, A.B., assistant instructor in physiologic chemistry.
Dr. Clarence K. Dengler, assistant in dermatology.
Dr. Joseph G. Ross, assistant in clinical medicine.
Dr. Jean Gowing, assistant in pediatrics.

RHODE ISLAND

Personal.—Col. James Hamilton, Jr., Providence, medical corps reserve, was ordered to active duty, September 1, at Carlisle Barracks, Pa., for a course of instruction to continue until about October 15.——At the forty-second annual meeting of the Rhode Island Medical-Legal Society, recently, Dr. Creighton W. Skelton was elected president; Roy McLaughlin, vice president, and Dr. Jacob S. Kelley, all of Providence, secretary-treasurer.

Health Institute.—The fifth annual New England Health Institute was held in Providence, September 29-30, under the auspices of the state health departments of the New England states, cooperating with the U. S. Public Health Service. Among the exhibits were those of cancer control in Massachusetts, the daily duties of a public health nurse in Connecticut, and the various literature on health prepared by the state health departments. About seventy-seven lectures were delivered in the various courses by well known authorities. There were trips to institutions and industrial plants, and to the state sanatorium at Wallum Lake by members of the New England Conference on Tuberculosis, which held its annual meeting in conjunction with the institute.

TENNESSEE

Personal.—Drs. Thomas G. Pollard and Thomas D. McKinney have been elected members of the board of commissioners of the Nashville General Hospital by the city council for terms of six years; Dr. McKinney succeeds himself and Dr. Pollard succeeds Dr. Rufus E. Fort, who declined another term.——Dr. William T. Pride, Memphis, has been elected president of the staff of St. Joseph's Hospital.

Society News.—The Tri-County Medical Society met at Lenoir City, August 25; Dr. William H. Arrants, Sweetwater, among others, discussed "Treatment of Toxemia of Pregnancy"; Dr. James G. Eblen, Lenoir City, "Treatment of Puerperal Infection"; Dr. John B. Cross, Harriman, "Minimizing Pain in Childbirth," and Dr. C. J. Carmichael, Knoxville, "Essential Features in Treatment of Stomach Disorders." ——Dr. Robert L. Bean, Cleveland, addressed the Bradley County Medical Society, August 18, on "Appetite"; the September 1 meeting of the society was a clinical meeting. ——Dr. Jere Crook, Jackson, addressed the Benton-Carroll-Henry-Weakley County medical societies, August 16, on "Traumatic Rupture of the Intestines," and Dr. Frank W. Smythe, Memphis, on "Urethral Strictures."——Dr. A. Del Campo, Malaga, Spain, addressed the Knox County Medical Society in August on "Significance of the Pleocaryocyte," and Dr. John A. McIntosh, Jr., on "The Donovan Body in Granuloma Inguinale."——Dr. Joseph A. Crisler entertained the Memphis and Shelby County Medical Society, September 17, at Duntreath Farms at a barbecue. At the August meeting of the society, Dr. W. Likely Simpson read a paper on "End-Results in Sinus Surgery," and Dr. William C. Colbert on "Diagnosis and Treatment of Subacute Bacterial Endocarditis."——Dr. and Mrs. William B. Dye, Springfield, entertained the Robertson County Medical Society on the high school campus, September 22, with a squirrel stew. The speakers were Drs. Oval N. Bryan and John Howard King of Nashville.

TEXAS

Society News.—Dr. Benjamin L. Schoolfield, Dallas, addressed the Grayson County Medical Society, August 9, at Denison, on "New Ideas in the Treatment of Weak Foot"; Dr. Robert B. Giles, Dallas, on "Treatment of Anasarca," and Dr. Howard L. Cecil, Dallas, on "Treatment of Bladder Tumors."——Dr. Charles M. Rosser, Dallas, among others, addressed the Smith County Medical Society, Tyler, recently, on "Exophthalmic Goiter."

Personal.—Dr. James H. Stephenson, Dallas, has been appointed superintendent of the city-county hospital, Dallas, to succeed Dr. Charles Standifer, who resigned to become superintendent of the state hospital at Austin.——Dr. George Caldwell, professor of pathology, Baylor College of Medicine, Dallas, and his wife, Dr. J. A. Caldwell, head of the laboratory and research department at the college, have accepted positions to manage the new hospital and clinic under construction at Mineral Wells by the Crazy Water Hotel Company. The first unit of fifty beds is expected to open about January 1.——Dr. William Thomas, until recently on the staff of the state hospital for the insane at San Antonio, has been appointed superintendent of the state hospital for the insane at Rusk.

Texas Claims a Record.—More cities in Texas have adopted the standard milk ordinance than cities in any other state in the Union. According to the state department of health, thirty-four towns have adopted this ordinance, and about a dozen others are planning its adoption. Milk sanitation, however, in some Texas towns is at a low ebb. A survey of municipalities is being made by the department to determine the status of milk supplies in regard to both sanitation and production, and as soon as possible an actual field survey of the dairies will be made. Dairies will be required to comply with sanitary regulations with regard to barns and equipment, tuberculin tested cows, screened milk houses, sterilized milk bottles, health certificates for milk handlers and provisions for cooling milk.

VERMONT

Owners May Catch Their Own Trout.—A municipal court recently decided that the state board of health cannot prohibit a man from fishing in his own streams in order to protect a city water supply, when it found Mr. Wiltse of Rutland, a real estate dealer, not guilty of violating the state board of health regulations. Mr. Wiltse fished in a stream on his own place in Mendon which contributes to a public water supply; he protested on the ground that the order was unreasonable and deprived him of his constitutional rights.

State Medical Meeting.—The one hundred and fourteenth annual meeting of the Vermont State Medical Society will be at Middlebury, October 13-14, under the presidency of Dr. Thomas S. Brown, Burlington, with headquarters in the town hall. The president of the Addison County Medical Society, Dr. Merritt H. Eddy, Middlebury, will give the address of welcome, and the governor of the state, John E. Weeks, the opening address. Other speakers will include George A. Soper, Ph.D., managing director of the American Society for the Control of Cancer, New York, on "New Aspects of the Cancer Problem"; Dr. Rock Sleyster, Wauwatosa, Wis., trustee of the American Medical Association; Dr. Bertrand E. Roberts, New York State Department of Health, on "Communicable Disease Control by the Physician"; Dr. Burton E. Hamilton, Boston, "Heart Diseases in Pregnancy"; Dr. Frank J. Lawliss, Richford, "Goiter in General Practice"; Dr. Stanton S. Eddy, Middlebury, vice president of the state society, "The Community Hospital," and Warren Austin, Burlington, "Prophylactic Prudence." There will be a symposium on physical therapy, Friday afternoon, participated in by Drs. Frank B. Granger, Edwin T. Wyman, Ernest M. Daland and Lawrie B. Morrison, all of Boston, and Dr. William D. McFee, Haverhill, Mass. The annual banquet will be at 7:30 p. m., Thursday evening, at the Middlebury Inn; tickets $2. There will be a reception, Thursday afternoon, at the inn to the visiting ladies, with Mrs. John E. Weeks as hostess, and Friday morning there will be drives about the college and government farm.

GENERAL

Society News.—At the annual meeting of the Medical Society of Missouri Valley, Des Moines, Iowa, September 14-16, Dr. Fred M. Smith, State University of Iowa College of Medicine, Iowa City, was elected president, and Dr. Earl C. Sage, Omaha, secretary. The next annual session will be held at Omaha, November, 1928.——At the organization meeting of the North Pacific Society for Internal Medicine, Tacoma, Wash., recently, Dr. Frederick Epplen, Spokane, was elected president; Dr. Charles E. Sears, Portland, Ore., vice president, and Dr. Lester J. Palmer, Seattle, secretary-treasurer.

Demand for Old Clothing for Flood Sufferers.—With the approach of cool weather, the demand for old clothing among persons in the flood area of the Mississippi Valley has increased. On September 3, the Red Cross was still feeding more than 62,000 persons, and more than 86,000 acres of land were still flooded. Secretary Hoover is said to have reported that there will be destitution in about twenty counties in the flood area during the winter, and that probably 2,000,000 acres of crop land will make no substantial money returns this year. It is estimated that $1,000,000 will remain from the Red Cross Relief Fund by January 1 to meet the need for further feeding and reconstruction.

Last Year's Measles.—The accounts of the causes of death during 1926 now being sent out by the U. S. Department of Commerce show that measles was a factor in increasing the death rate of several states, while as yet the reports have been received for a few states only. It is noted that the mortality rate for measles in West Virginia last year, as compared with the measles rate for the preceding year, increased from 3 to 18; that the measles death rate in New Hampshire increased from 2 to 9, and in Maryland from 2 to 14 per hundred thousand of population. It was noted also that in the explanation for the increase in death rate in these states each of them also showed an increase in the rate from influenza.

Two Psychiatric Fellowships.—The National Committee for Mental Hygiene announces that two fellowships for training in extramural psychiatry are available for qualified candidates at the Institute for Child Guidance in New York City. The positions are open to physicians under 35 years of age who are graduates of class A medical schools and who have had at least one year of training in a hospital for mental disease. The fellowships, which have been created by the Commonwealth Fund, provide special training for physicians who wish to prepare themselves for community work in the fields of child guidance, delinquency, education and dependence. Inquiries should be addressed to Dr. Frankwood E. Williams, medical director of the committee, 370 Seventh Avenue, New York.

Winners in American Medical Golfing Association.—The winner of the association championship for thirty-six holes for 1927 was Dr. George J. McKee, Pittsburgh, whose score was 168 gross. The winner of the association handicap for thirty-six holes was Dr. Alonzo C. Smith, Wooster, Ohio (145 net); the winner of the choice score handicap was Dr. Harry A. Fowler, Washington, D. C. (65 net); the eighteen hole championship was won by Dr. Homer Nicoll, Chicago (79 gross), and the section championship by the laboratory group team (332 net). The officers elected for the ensuing year are Dr. Walter D. Shelden, Rochester, Minn., president; Dr. Albert F. Henning, Chicago, vice president, and Dr. Harry H. Kerr, Washington, D. C., secretary-treasurer. Dr. Olin West, secretary of the American Medical Association, and Dr. Morris Fishbein, editor of THE JOURNAL, were elected to honorary membership in the association.

HAWAII

Hospital News.—The Catholic Mission formally opened a few weeks ago the St. Francis Hospital in Honolulu.——Weekly clinics are held at the Queen's Hospital, Honolulu, where there is an abundance of clinical material, particularly in obscure skin diseases. The clinics are well attended.

Territory Now Has County Societies.—Last year the old Hawaii Medical Society was reorganized and renamed the Hawaii Territorial Medical Association. Each island heretofore without a local medical society has now organized its own county society, with Dr. Samuel R. Brown, Hilo, president of the Hawaii County Medical Society; Dr. Alfred H. Waterhouse, Koloa, president of the Kauai County Medical Society; Dr. F. G. Edwards, Waiakoa, president of the Maui County Medical Society, and Dr. Guy C. Milnor, Honolulu, president of the Honolulu County Medical Society. The presidents of each local society serve as vice presidents of the territorial organization, the president of which since the annual meeting in May is Dr. Arthur G. Hodgins, Honolulu.

FOREIGN

Infantile Paralysis in Leipzig.—Nearly 200 cases of infantile paralysis had been reported at Leipzig up to September 28, when twenty-four new cases were reported from Borna, Grimma, Oschatz and Rochlitz.

British Association Meets in Canada in 1930.—At its recent annual meeting in Edinburgh, the representative body of the British Medical Association approved the recommendation of the council to hold the annual meeting in 1930 in Winnipeg, Canada. The annual meeting in 1929 will be in Manchester, England. At the Edinburgh meeting, Sir Robert W. Philip, professor of tuberculosis, University of Edinburgh, and honorary physician to the king at Scotland, was inducted into office as president of the association for 1927-1928. Sir Ewen McLean, gynecologist at the Cardiff Infirmary, was made president elect; Dr. Charles O. Hawthorne, chairman of the representative body, and Mr. Bishop Harman, treasurer.

Postgraduate Course on Nervous Diseases.—A postgraduate course on diseases of the nervous system will be given at the National Hospital, Queens Square, London, England, October 3-November 25, consisting of demonstrations, clinical lectures, teaching in the outpatient department and pathologic lectures and demonstrations. A course chiefly on methods of examination of the nervous system will also be given, and during the same period a course of advanced psychiatry will be held at the Maudsley Hospital. The periods have been so arranged that medical practitioners can attend both courses. A limited number of students can be enrolled as ward clerks or as clinical assistants in the outpatient department. Further information will be given by the secretary, medical school, National Hospital, Queens Square, London, W C 1.

Deaths in Other Countries

Alban Henry Griffiths Doran, consulting surgeon to the Samaritan Free Hospital, London, August 23, of acute glaucoma.——Prof. **Svante Arrhenius,** director, physicochemical department, Nobel Institute, Stockholm, Sweden, since 1905; for many years a professor at the University of Stockholm; originator of the theory of electrolytic dissociation; received the Nobel Prize, and the Willard Gibbs Medal, Chicago, 1911; author of "Life in the Making," "Chemistry and Modern Life," and other books; at Stockholm, October 2, aged 68, after a week's illness. Few persons contributed to as many fields of science as Dr. Arrhenius; his work has had a great influence on laboratory medicine.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 17, 1927.

Darwin's Home for the Nation

In his presidential address to the British Association, Sir Arthur Keith made an appeal for a fund to purchase Darwin's home at Downe in Kent, where he did most of his epoch making work, so that it might be preserved for the nation. The appeal met with a prompt response. Mr. George Buckston Browne, a retired genito-urinary surgeon, on reading the appeal at once telegraphed to Sir Arthur offering to make himself wholly responsible for the gift. His motive was to allow future generations to see Darwin's home, which, with its estate, might otherwise pass into the hands of builders. The cost, with some endowment fund, is estimated at from $60,000 to $75,000. Mr. Browne has made it a condition that no other contributor is to be asked to share the cost with him. He was admitted to the membership of the College of Surgeons in 1874, and for fourteen years acted as assistant to Sir Henry Thompson, the leading genito-urinary specialist of his day. He is an antiquarian and an enthusiastic collector. In offering to buy Downe House and to establish a fund for its perpetual upkeep, he is giving expression to his profound admiration for the work of the great naturalist. He considers that the house in which evolution was cradled should be as reverently preserved as Shakespeare's birthplace. He desires that the house should be restored as nearly as possible to its condition when Darwin lived there. When the house and garden have been restored, he would wish them to be opened without charge to visitors, who could then be shown Darwin's study, laboratory and living rooms much as when he left them. He also expressed the wish that some physician of slender means and good record should be appointed the custodian. Sir Arthur Keith has suggested that out of the endowment fund money should be spared for a prize to be given every second year for the best contribution to biologic knowledge. Downe House is the property of Darwin's son, Prof. Francis Darwin, and is now used as a school for girls.

Excessive Drug Addiction of Panel Patients

It is estimated that panel prescriptions to the number of 47 million are dispensed annually and that the drugs and appliances cost $10,000,000. The regulations having failed to check this colossal expenditure, the minister of health has, evidently in despair, made an extraordinary agreement with the pharmacists. They will "collectively accept liability for the provision of all the drugs and appliances prescribed for insured persons and in return receive the maximum amount available for the purpose." The agreement is to run for six years, subject to the right of the pharmacists to ask for revision in certain contingencies. The minister has undertaken that the annual sum available shall not be less than 66 cents for each insured person. He has also undertaken to adopt every practical means with a view to checking unnecessary prescribing. Once more the inevitable weakness of socialism is shown. Those concerned in the expenditure of this colossal sum on drugs have no effective interest in economy. The insured can be drugged to their hearts' content without expending a cent, and the English working classes have a pathetic faith in drugs. The late Sir Frederick Treves said that "the craving for bottles of medicine in this country was only second to the craving for drink." The only check on this craving is the refusal of the physicians to prescribe. But they have no interest in economy

beyond the small one of being taxpayers, which is much more than counterbalanced by the desire to avoid unpopularity and loss by the transference of the patients to other lists. But the new system, devised to avoid one evil, introduces others and apparently greater ones. The pharmacists gamble on the amount of prescribing. They get the last cent of the available sum. If overpaid, they pocket the gain. If underpaid or even if they bother the government by putting up a case, they may get more. "Heads I win, tails you lose." Moreover, as the *British Medical Journal* points out, it is to the financial advantage of pharmacists that the quantity and quality of drugs supplied shall be as small and as inferior as possible and there may be a temptation for the ministry to bring undue pressure to bear on panel physicians to restrain the amount and nature of their prescribing. Curiously, a fact which seems to have been forgotten, it was this very objection that physicians (who in this country usually dispense their own medicines) would economize at the expense of patients that causes Mr. Lloyd George in drafting the insurance act to take dispensing out of the physicians' hands and hand it over to the pharmacists. So much for the attempt of the most astute politician of the day to avoid, but only in one small respect, the evils of his socialistic act.

Treatment of After-Effects of Epidemic Encephalitis

A conference on epidemic encephalitis of health officers, representatives of the ministry of health, board of education, and board of control, which controls lunacy administration, was held under the presidency of the secretary to the ministry of health. He recommended that the procedure adopted in Bristol for dealing with patients suffering from late manifestations of the disease be carried out throughout the country. There are in Bristol between 150 and 200 such patients who have been treated in a poor law hospital for long periods. The best results have been obtained from open-air treatment. The adults sleep on balconies and are encouraged to follow outdoor pursuits during the day. Terraces in front of the hospital have been made into putting greens. The installation of wireless has also given a new interest to many patients and improved their powers of concentration. The fewest number of refractory cases occur among children. They are also kept in the open air as much as possible. They attend a school in the hospital for three hours daily. Their diet includes fruit and cod liver oil and malt with iron. Ultraviolet irradiation has been given during the winter, and no definite improvement has followed. Exposure of the parotid glands to the roentgen ray in patients with excessive salivation has been tried, but the results are disappointing. Massage and remedial exercises are given to both children and adults; the improvement of the physical disabilities is slow, but the effect on the morale of the patients is excellent. Children suffering from inversion of the diurnal rhythm have been put to sleep in rooms illuminated with various colored lights; of these blue seems to have the most soothing effect. On the whole, however, this line of treatment is a failure, and much better results are obtained from a firm but kindly discipline. Restlessness and sleeplessness are found to be better overcome by producing natural fatigue than by the use of drugs. Boys who could not sleep at night were encouraged to kick about a football by day until thoroughly tired. Their restlessness soon vanished. Drug treatment both in children and in adults is disappointing, and the prognosis of patients with the parkinsonian syndrome is found to be bad. These results have led the Bristol health authorities to conclude that the majority of patients suffering from the late effects of epidemic encephalitis are unsuitable for treatment under the mental deficiency act and that they benefit most by an outdoor life under discipline. If this plan proves successful it will not be necessary to build large and expensive institutions for dealing with the disease, as has been proposed.

PARIS

(From Our Regular Correspondent)

Sept. 6, 1927.

Foot-and-Mouth Disease

Foot-and-mouth disease, or aphthous fever, still prevails. According to recent advices, the disease has affected numerous animals in western France. In the department of Orne especially, 285 communities and 18,746 head of stock (bovines) have been affected. With few exceptions, the disease has been mild. The problem is of interest not only to the veterinarian but also to the physician, owing to the fact that the disease is occasionally transmitted to man. A strict supervision is useful, but, in view of the difficulties encountered in trying to prevent clandestine removals of infected animals, by which the disease is spread over the countryside, energetic researches are being made to prepare a suitable vaccine.

The Permanent International Committee on Occupational Diseases

The fourth international meeting of the permanent international committee on occupational diseases will be held at Lyons, April 3-6, 1929. The topics on the program are: (1) silicosis (three papers, on etiology, clinical aspects and legislation, respectively, and a general paper on pneumonoconiosis); (2) cataract of occupational origin (two papers, one on etiology and one on clinical aspects); (3) the endocrine apparatus in relation to intoxications (a single paper to be prepared by three collaborators), and (4) communications on the results of unpublished researches. If it should be found feasible to add a fifth topic to the program, the subject selected will be statistics on occupational diseases. Prof. Etienne Martin of the Institute of Legal Medicine in Lyons, in collaboration with Professors Agasse-Lafont and Kohn-Abrest of Paris, and in agreement with the president, is charged with the duty of selecting the speakers on the various topics.

The Union of Medical Biologists

The Syndicat des médecins biologistes, which is of recent origin, held its first general meeting in the hall of the Société des médecins de Bordeaux, under the chairmanship of M. Mougneau, assisted by MM. Vansteenberghe, vice president; Cuvier, secretary; Servantie, treasurer, and Senez and Musso, councilors. Only such topics were approved as concern directly the practice of specialties in the provinces. A study on social insurance was then presented. Afterward, questions pertaining to deontology were considered. In order to permit an exchange of views indispensable to colleagues practicing in Paris and having many points of interest in common, a special meeting was decided on to be held in Paris during October, the exact date to be announced later.

Draft of New French Law Pertaining to Social Insurance

The senate has passed the social insurance bill, which must be approved by the chamber of deputies before it becomes effective. The contemplated legislation involves a great social problem affecting a large class of the population of France, but the application of such a law will constitute a heavy charge on all producers. The provisions of the bill if passed will protect the insured against sickness, premature invalidity, old age and death, and will furnish likewise a certain measure of aid in connection with childbirth. The bill distinguishes two classes of insured: those for whom insurance is compulsory and those for whom it is optional. To the first class belong all salaried persons of both sexes (employees, workmen, domestics) engaged in industry, commerce and agriculture, whose annual income is less than 15,000 francs, if they have no children, and less than 18,000 francs if they have a child, including also certain farm

renters who have no leased live stock. The second class is comprised by the other farm renters, farmers, agriculturists, artisans, the small shop-owners, intellectual workers without salary, and the like. The health insurance covers the cost of both general and special medical treatment, the cost of medicines and therapeutic apparatus, surgical intervention, and care in a hospital, a health center or a sanatorium. The insured has free choice of a physician. He must, however, assume from 15 to 20 per cent of the expenditures for medical treatment and 15 per cent of the cost of drugs. Medical treatment will be given from the beginning of the sickness and will extend over a period of six months, and not only the insured but also his wife and any children under 16 years of age will be entitled to the same treatment as the head of the family. The insured who, by reason of sickness, is unable to continue his work will receive half his salary, dating from the sixth day of his illness and extending over a period of six months. Insured women and the wives of insured men will be given medical treatment and pharmaceutic supplies, not only during pregnancy, but also for the six months following their confinement, at a charge equal to from 15 to 20 per cent of the actual cost. For six weeks after confinement they will receive half of the amount of their regular wages or salary. Mothers who nurse their children will receive 100 francs a month during the first two months, and a decreasing sum during the months following, up to one year. The insured who, after six months of treatment, is still ill and suffering from a condition that reduces by two thirds his capacity to work will be entitled to an invalidity pension. He will continue to receive medical treatment and pharmaceutical supplies at from 10 to 20 per cent of the cost. The invalidity pension is relatively larger the younger the insured is when he becomes incapacitated. The insured will be entitled to a retiring pension at the age of 60. The amount will vary according to the total amount paid in. In case of the death of the insured, his wife, descendants, or relatives in the ascending line, will receive an amount equal to 20 per cent of his annual salary. The bill provides, under certain conditions, protection against loss of employment for all persons for whom insurance is compulsory if they are of French nationality. Persons who are required to be insured are obliged to pay a premium equal to 5 per cent of their salary and the employer must contribute a like amount. Persons who voluntarily accept insurance pay a premium equal to from 5 to 10 per cent of their salary, as they may desire, with corresponding benefits.

A New Federation

A federation representing the interests of persons who have undergone trephining operations or suffered severe head injuries, whether residing in France or the French colonies, has been formed and has assumed the title of F. N. T. B. T., or the Fédération nationale des trépanés et blessés de la tête.

The Use of White Lead and Lead Salts in the Manufacture of Enamels

More than 25 per cent of the total number of persons affected with lead poisoning are employees in enamel works. But before the use of such enamels can be prohibited totally the use of lead compounds should be forbidden in the cases in which they are particularly harmful; namely, in the enamels termed "opaque" and "sanitary," employed in the manufacture of household and kitchen utensils and toilet articles. For enamels termed "ceramic" the use of lead might be tolerated, for the time being, provided all the regulations of hygiene are strictly observed. The general council passed a resolution that parliament should supplement, as soon as possible, the law of July 20, 1909, against lead poisoning by the addition of a section prohibiting the use of lead enamels in enameling plants.

ITALY

(From Our Regular Correspondent)

Aug. 31, 1927.

Legacy to the Institute of General Pathology in Genoa

The Institute of General Pathology of the University of Genoa recently received a legacy of several million liras from the estate of Dr. Mangiamarchi, who died at Pretoria, Transvaal, where he was established and where he accumulated a fortune. By testamentary provision, the bequest must be devoted to the development of the new institute that was opened last year.

Hygienic Supervision of Bathing Establishments

The minister of the interior has called attention to the necessity of exercising constant hygienic supervision over bathing establishments. Supervision should be extended to the licensing, operation and mode of functioning of various establishments, to prevent or eliminate any disadvantages that may result to patrons from the nonobservance of established regulations.

Congress of Ocular Hygiene

The Congress of Ocular Hygiene and Infantile Ophthalmology was held recently in Naples under the chairmanship of Professor Angelucci. The chairman recalled that, in October of last year, the Ophthalmologic Congress, at its meeting in Rome, passed a resolution that children with symptoms of adenoid, otorhinopharyngeal, ocular and dermatologic disorders should all have the benefits of a course of treatment at a thermal bath resort. The treatment has begun to be applied. By means of physical therapy, pathologic symptoms that otherwise come within the purview of various clinics can be treated simultaneously.

INDIVIDUALISM IN OPHTHALMOLOGIC PATHOLOGY

Dr. Vincenzo Rossi, of the Eye Clinic in Naples, discussed in his paper individualism in ophthalmologic pathology. He spoke of the synthesis of embryologic, nervous, endocrine and chemicophysical interrelationships, and the bearing on eye disease of the general morphology of the individual as influenced by hereditary and environmental factors. Instability and decreased functional activity of the eye and its various parts are the substrate on which eye diseases develop. Hereditary factors do not have quite the same importance that was formerly ascribed to them in explanation of the causation of disease. Environmental factors such as the type of life and work of the individual are important. Thus is confirmed the aphorism of Hippocrates, which has been developed further by De Giovanni and Virchow, that there is a harmonious relation between the various organs which constitutes the fundamental law of the constitution in man. Whenever disharmony develops, disease is lurking in the offing.

Professor Castellino, director of the First Medical Clinic of Naples, addressed the assembly on the relations between the anatomy and the physiology of the eye in the fetus, in childhood and in the adult stage, and considered the stages of organic and constitutional development closely associated with morphology.

The reorganization of the Associazione oftalmologica italiana was decided on, and Palermo was selected as the next place of meeting in 1928 under the chairmanship of Professor Lodato, director of the eye clinic of that city.

Hospital Aid and Autonomous Bodies

The commission for the study of problems affecting autonomous bodies, which has its headquarters in Rome, has instituted an inquiry into the question of hospital aid and has begun with the province of Rome. The problem is a serious one and involves, on the one hand, the safety of the

public health, while, on the other hand, the communes are often compelled to make enormous economic sacrifices. For example, the communes of the province of Rome are at present indebted to the united hospitals of the capital to the extent of twenty million liras, and many of the hospitals are no longer able to meet their obligations owing to the meager resources of their own budget. The commission has decided on the creation of a bureau whose duty it will be to reduce as far as possible the hospital expenditures charged to the communes.

The College in Perugia for the Benefit of Orphans of Sanitarians

By a recent order, the annual contribution that all Italian sanitarians representing the state or other public bodies are compelled to pay in support of the college in Perugia established for the benefit of orphans of sanitarians has been increased from 24 liras to 60 liras. Also the government, through the influence of Professor Simonetta, senator, president of the Opera Pia, has increased its annual contribution from 20,000 liras to 50,000 liras.

Honorary Degrees Conferred

Prof. Vittorio Ascoli, director of the Clinica Medica of Rome, has received from the University of Edinburgh the degree of doctor honoris causa.

The University of Rome has conferred on Prof. Fernando Perez, ambassador of Argentina to the king of Italy, the degree of doctor of medicine and surgery honoris causa.

The Title of Professor Emeritus

Professor Queirolo, a clinician of Pisa, in a discourse before the senate requested the minister of public instruction to take such action as is needed to restore the title of "professor emeritus" for eminent professors who are compelled to resign their posts on reaching the age limit. The abolition of this age-old distinction brought it about that such men as Antonio Cardarelli and Leonardo Bianchi, who, one for a period of seventy-five years and the other for fifty-five years, were outstanding leaders in Italian institutions of higher learning, died outside the *Famiglia Universitaria*, the family of university professors.

THE NETHERLANDS

(From Our Regular Correspondent)

Aug. 22, 1927.

The Medical School at Weltevreden

The medical school at Weltevreden (Dutch East Indies), which was to open August 1, will confer on its graduates a diploma having in the Dutch East Indies the same recognition as the diploma given by the medical schools of the Netherlands.

An Arbitration Court

A court of arbitration has been created at Amsterdam to adjudicate any differences that may arise between the Rijksverzekeringsbank, the central and official accident insurance organization, and physicians enrolled in the Nederlandsche Maatschappij tot Bevordering der Geneeskunst. The arbitration court is organized by the central government and comprises a president who is a jurist and four physicians chosen by the parties to a controversy.

International Federation of Eugenic Organizations

The international conference dealing with eugenic problems will be held in Amsterdam in September, 1927. It will take place at the same time as the assembly of the international institute of anthropology. There are two topics on the program: (1) cross breeding in man; speakers, Drs. Davenport and Myoen, and (2) the meaning of the term "eugenic"; speaker, Dr. A. Govaerts.

Consultation Center on the Rearing of Children

For some time past, Amsterdam has had a consultation center on the rearing and training of children. The center is in charge of a teacher and a medical psychiatrist. The center has a psychotechnical laboratory and a few boarding pupils. The bureau resembles the consultation centers established in America for backward children.

Epidemic Cerebrospinal Meningitis

A statistical survey covering the period from 1905 to 1926 gives figures on epidemics of cerebrospinal meningitis observed in the Netherlands. From 1905 to 1915 only sporadic cases were noted, the smallest number (seven) being recorded in 1911 and the highest (forty-one) in 1907. With the beginning of 1916, there was a recrudescence of cases, which passed from 226 in 1916 to 580 in 1917 and in 1918 dropped again to 234, since which time the total has ranged around a hundred cases each year.

The Use of Ultraviolet Rays in the Schools

Dr. Hingst, school medical inspector in Utrecht, is about to begin, in certain classes of the schools, a series of experiments based on the use of vitaglass, a special type of glass that permits the passage of ultraviolet rays. These observations will be made in three groups, with children of the same age, the same physical development, and receiving the same instruction under the same conditions. The schoolroom of the first group will have no glass in the windows, the second group will occupy a room with ordinary window glass, and the third group will have a room with windows provided with vitaglass. After a few months, the weight, height and the blood count of each of the pupils will be determined and comparisons will be instituted.

Aid for the Infirm

The Central League for the Aid of the Infirm has published a memorial from which it appears that the number of infirm persons under 15 years of age is estimated at 30,000 for the whole country, many of whom are in need of assistance and would profit by better care. The league is inquiring into the conditions under which treatment could be generalized, consultation centers organized, and possibly an orthopedic clinic created under the control of the league.

The Factory Physician

Mention has already been made of the creation of the Nolens commission, which is charged with the duty of inquiring into the work of factory physicians and proposing a plan for their control. The commission was appointed the beginning of 1927, and has published a report. The report defines the term "factory physician" as a physician who receives a fixed salary from an industrial enterprise, and who, in return, takes charge of the accident service, organizes the introduction of safety methods, looks after the general hygiene of the factory, and the like. With that object in view, he must spend certain hours at the factory, equip an operating room, and train a personnel capable of caring for the sick and injured.

The commission considered the following questions: (1) treatment of the injured by factory physicians and the influence on the average number of days absent from work (it was found that the number of days lost was less in those establishments in which there was a physician); (2) can the factory physician serve, at the same time, as attending physician and as an expert in the adjustment of invalidity claims? (the opinions of the commission differed on this subject, it being contended by some members that treatment and control of insurance or compensation should be in the hands of different persons), and (3) the possibility of the free choice of physician. An injured person should not be compelled to

accept treatment at the hands of a given physician, against his will. The commission recommended, however, that industrial organizations having a factory physician be absolved from referring to the central insurance society, the Rijksverzekeringsbank, petty accidents involving a loss of not more than six weeks' time, and be allowed to handle such minor cases without intervention. The commission advised further that a law be enacted providing for administrative control of factory physicians, for the organization of factory medical services, and for the determination of competence. The law should require the keeping of a register of all accidents. The factory medical services should be under the control of the central insurance organization, the Rijksverzekeringsbank. The injured person should have the privilege of summoning the physican of his choice to care for him.

BERLIN

(From Our Regular Correspondent)

Sept. 3, 1927.

Physicians and the New Penal Code

Owing to many difficulties inherent in the problems involved and by reason of many considerations of an internal, political nature, the drafting of a new penal code has been no simple matter but has extended over many years—several decades, in fact. But the work has finally been completed, and the proposed draft has been submitted to the reichstag for its action. Many of the provisions are of great interest to the medical profession. According to the old penal code, and particularly according to the interpretation of the federal courts, every medical intervention is, in principle, regarded as a bodily injury, and whether it is punishable or not depends on whether or not the person concerned, either expressly or tacitly, consented to the intervention, or whether the physician could, at least, assume, in the nature of the case, that he gave his consent. According to the language of the new draft, it is expressly assumed that interventions and treatments which are in keeping with the precepts of a conscientious physician are not punishable bodily injuries within the meaning of the penal code. The provision that any one who gives another curative treatment against his will shall have a fine imposed or be given a prison sentence for three years (but only on demand of the person so treated) shall not be applicable if the situation of the person treated or of the physician is such that the consent of the person treated cannot be secured in time without seriously endangering his life or health. This restriction is made in view of the cases in which the physician is obliged to reach quick, independent decisions in the treatment of a patient and in which he does not have time to get the consent of the patient to the treatment.

According to the provisions of the old penal code, it was a somewhat serious matter for a physician to induce an abortion though convinced that the therapeutic indications were sound; in fact, it was not impossible that he might be found guilty of a misdemeanor and receive a sentence even though his action was supported by scientific evidence. In the new draft the right of the physician to interrupt a pregnancy is, therefore, defined by the following section: If a licensed physician interrupts a pregnancy, it is not an illegal abortion, since, according to the rules of medicine, it is sometimes necessary, when no other intervention will suffice, to take such action in order to ward off serious danger for the life or the health of the mother. Furthermore, homicide, within the meaning of this law, does not obtain if a licensed physician, for analogous reasons, destroys the life of a child about to be born. Whether or not the mother of the child consents to the intervention plays no part in the matter. However, in case a physician, against the will of the pregnant woman, interrupts a pregnancy, though on well established medical principles, or destroys the life of a child about to be born, he may be punished for unauthorized treatment (compare above). In the new draft the right to interrupt a pregnancy (as just described) is reserved to licensed physicians alone, midwives and also quacks being excluded. The right to interrupt a pregnancy for other than medical reasons (for example, on social or eugenic grounds) is not recognized by the proposed law; nor is interruption of pregnancy during the first three months of gestation (which is demanded by many, especially women) permitted.

Violation of the right of privileged communication is also punishable, according to the proposed law. The punishment is more severe (as compared with the former code) if the violation of professional secrecy is committed for a consideration or for the purpose of procuring for oneself or for another person an unlawful advantage or with intent to injure another person. On the other hand, the physician shall be exempt from punishment if he reveals a professional secret to protect a justifiable public or private interest that could be protected in no other way, and if it can be shown that the endangered interest was of predominant importance. The right of privileged communication applies, however, only to physicians and not to quacks. It is thought that this differentiation will serve to check somewhat the growth of quackery, it being held that many patients will hesitate to consult quacks if these are at liberty to speak without reservation in regard to a patient's condition. Homosexual intercourse is punished as in the former code; likewise sexual intercourse with animals. The advertising of remedies to induce abortion, which, in general, is subject to penalties, is permitted if the advertising matter is delivered to licensed physicians or to persons who are entitled to handle such remedies or devices, or if the advertising appears in medical or pharmaceutic journals.

An Airplane-Ambulance

An airplane-ambulance has been constructed. A well stabilized two-motor airplane with a large carrying deck receives and transports a lightly built ambulance, which obviates the necessity of transferring the wounded and sick. The pilot of the plane lands as near as possible to the scene of the accident. He than takes his seat in the ambulance and, assuming the rôle of chauffeur, backs the ambulance out of the plane. The patient is placed in the ambulance and the latter is driven on the carrying deck of the plane and securely blocked. The pilot resumes his seat in the plane and departs. As the ambulance is carefully located with reference to the center of gravity of the plane, it is possible to make a flight without the ambulance.

Marriages

MARION LOFTON PATTON, Memphis, Tenn., to Miss Edna Womack of Whitewright, Texas, October 6.

GEORGE B. HYDE, Wilmington, Vt., to Mrs. Fanny Cutler Hall of Bakersfield, September 13.

H. CLIFFORD STILLWELL, Maiden, N. C., to Miss Vertie Jelly of Frackville, Pa., in September.

FRANK H. COLLINS to Mrs. Laura Cain, both of Goldendale, Wash., at Maryhill, July 26.

EMIL J. MECKSTROTH to Miss Mary Evalyn West, both of Dayton, Ohio, August 17.

BELA COLMAN BALAS, Brownsville, Pa., to Miss Emma Lepotskey, September 7.

FRANK ROSE to Mrs. Grace McKensie, both of Spokane, Wash., August 4.

Deaths

Joseph Howell Way ✠ Waynesville, N. C.; Vanderbilt University School of Medicine, Nashville, Tenn., 1886; member of the House of Delegates of the American Medical Association, 1904-1909, and in 1909, member of the Reference Committee on Sections and Section Work; since 1905, member, and since 1911, president of the state board of health; past president of the Medical Society of the State of North Carolina and past president and secretary of the Tri-State Medical Society; member of the state board of medical examiners, 1897-1902, the International Congress on Tuberculosis, 1908, and the American College of Physicians; colonel, medical reserve corps, U. S. Army; formerly medical officer in charge of the U. S. Veterans' Vocational Training School, Waynesville; served during the World War; trustee of Duke University, Durham; aged 61; died, September 22, at Asheville, of heart disease.

Frank Crowell Bishop ✠ Los Angeles; Medical Department of the University of Southern California, Los Angeles, 1914; member of the American Psychiatric Association; served during the World War; formerly a medical director of the Compton (Calif.) Sanitarium and on the staff of the Queen of Angels Hospital; aged 44; died, September 3, of heart disease.

Louis E. Vermillion, Lyons, Kan.; Keokuk (Iowa) Medical College, 1891; member of the Kansas Medical Society; past president of the Rice County Medical Society; county health officer; formerly on the staff of the Rice County Hospital, now known as the Lyons Hospital, where he died, August 14, aged 77.

Jacob Fuhs ✠ Brooklyn; Medical Department of Columbia College, New York, 1875; member of the American Gastro-Enterological Association; on the staffs of the Jewish, Long Island College, Wyckoff Heights, St. Catherine's, and the Israel-Zion hospitals; aged 77; died, September 18, of angina pectoris.

Charles E. Sadtler, Baltimore; University of Maryland School of Medicine, Baltimore, 1873; member of the Medical and Chirurgical Faculty of Maryland; aged 76; died, September 9, at the Union Memorial Hospital of uremia, following enlargement of the prostate.

Eva Walter Walker ✠ Appalachia, Va.; University of Louisville (Ky.) School of Medicine, 1915; on the staff of the Appalachia Masonic Hospital; aged 36; was drowned near Rose Hill, in August, when the boat in which he was crossing a stream overturned.

Robert Thompson Glendenning ✠ Manchester, Mass.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1892; for seven years member of the school board; aged 62; died, September 3, at the Beverly (Mass.) Hospital, of septic sore throat.

De Los Leonard Parker, Detroit; University of Michigan Medical School, Ann Arbor, 1883; emeritus professor of pharmacology and therapeutics, Detroit College of Medicine and Surgery; veteran of the Spanish-American War; aged 69; died, August 27.

James Francis Bell, Portland, Ore.; University of Toronto Faculty of Medicine, Toronto, Ont., Canada, 1882; emeritus professor of medicine, University of Oregon Medical School; aged 67; died, August 14, of diabetes mellitus and cerebral arteriosclerosis.

Samuel Martin Strohecker ✠ Portland, Ore.; University of Illinois College of Medicine, Chicago, 1899; president of the Portland City and County Medical Society; aged 57; died, August 27, at St. Vincent's Hospital, of cirrhosis of the liver.

Hugh Miller Moore ✠ Oxford, Ohio; Johns Hopkins University School of Medicine, Baltimore, 1899; member of the county board of health; aged 51; died suddenly, September 1, at the Mercy Hospital, Hamilton, of cerebral hemorrhage.

Frank C. Folks, Waycross, Ga.; Savannah Medical College, 1876; member of the Medical Association of Georgia; formerly member of the state legislature and mayor of Waycross; aged 74; died, August 5, of arteriosclerosis.

Joseph Adolphus, Lincoln, Neb.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1899; Creighton University School of Medicine, Omaha, 1908; aged 49; died, August 29, at Hot Springs, S. D., of pneumonia.

James Hubert Smith ✠ Clovis, Calif.; Vanderbilt University School of Medicine, Nashville, 1921; on the staff of the McMurtry Sanitarium; aged 32; died, in August, of injuries received in an automobile accident.

Eugene Fay Naylor, Springfield, Ill.; Rush Medical College, Chicago, 1920; member of the Illinois State Medical Society; served during the World War; aged 34; died suddenly, August 27, in Chicago, of heart disease.

Corbin D. Stevens, Magnolia, Ark.; Kentucky School of Medicine, Louisville, 1894; member of the Arkansas Medical Society; aged 55; died, August 3, at Modern Hospital, Hot Springs National Park, of nephritis.

James K. Ritter, Seymour, Ind.; Kentucky School of Medicine, Louisville, 1893; member of the Indiana State Medical Association; aged 63; died, September 1, of cirrhosis of the liver and pulmonary infarct.

Hiram Henry Hunt ✠ Hazleton, Iowa; University of Illinois College of Medicine, Chicago, 1901; served during the World War; formerly member of the school board; aged 60; died, September 3, of carcinoma.

William Otto Gossett, Brookston, Ind.; Medical College of Indiana, Indianapolis, 1905; member of the Indiana State Medical Association; aged 58; died, September 3, at Albuquerque, N. M., of tuberculosis.

William Abram Drake, Weymouth, Mass.; Medical School of Maine, Portland, 1879; member of the Massachusetts Medical Society; Civil War veteran; aged 77; died, August 22, of angina pectoris.

Samuel Warren Wilson, Harlingen, Texas; Washington University School of Medicine, St. Louis, 1901; member of the State Medical Association of Texas; aged 51; died, June 18, of heart disease.

John W. Carothers ✠ Lincoln, Neb.; Lincoln Medical College, 1913; for many years on the staff of the Lincoln Hospital; aged 43; died, August 29, of streptococcus endocarditis and septicemia.

Paul Tidence Young ✠ Gloucester City, N. J.; Jefferson Medical College of Philadelphia, 1916; on the staff of the Cooper Hospital, Camden; aged 34; died, August 28, of carcinoma of the scalp.

James Allan Lee, Gardi, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1914; member of the Medical Association of Georgia; aged 42; died suddenly, August 31, of food poisoning.

William E. Atkins, Hampton, Va.; Leonard Medical College, Raleigh, 1896; on the staff of the Hampton Training School for Nurses and the Dixie Hospital; aged 59; died, August 27.

Katherine E. James, Rockford, Ill.; Hahnemann Medical College and Hospital, Chicago, 1895; aged 58; died, August 18, at Carroga Lake, N. Y., of carcinoma of the rectum.

Wood Carson Baker ✠ San Mateo, Calif.; Cooper Medical College, San Francisco, 1903; on the staff of the Mills Memorial Hospital; aged 50; died, August 17.

Millard Francis Shafer, Cobleskill, N. Y.; Albany Medical College, 1903; served during the World War; aged 47; died, May 6, of pneumonia.

William Kemble, Kingston, N. Y.; University of Missouri School of Medicine, Columbia, 1882; aged 70; died, May 31, of angina pectoris.

Ernest Glenn Treat, Elmira, N. Y.; Jefferson Medical College of Philadelphia, 1904; aged 53; died suddenly, August 26, of angina pectoris.

Cornelius C. Gallagher, Ironton, Ohio; Miami Medical College, Cincinnati, 1897; aged 55; died, August 30, of pernicious anemia.

Lena Hatfield, Chicago; University of Illinois College of Medicine, Chicago, 1906; aged 52; died, August 28, of cerebral hemorrhage.

Morey Smith Collier ✠ Rochester, N. Y.; Bellevue Hospital Medical College, New York, 1880; aged 75; died, August 18, of heart disease.

Arthur E. Davis, Arbala, Texas; Kansas City (Mo.) Medical College, 1899; aged 70; died, August 27, of influenza and bronchitis.

William B. Haskell ✠ Oxford, Maine; Dartmouth Medical School, Hanover, 1890; aged 66; died, June 17, of cerebral hemorrhage.

William L. Bailey, Joplin, Mo.; Missouri Medical College, St. Louis, 1879; aged 70; died, May 25, of lobar pneumonia.

James C. Raley, Avera, Ga.; University of Georgia Medical Department, Augusta, 1881; aged 69; died, June 12.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE JOURNAL'S BUREAU OF INVESTIGATION, OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER GENERAL MATERIAL OF AN INFORMATIVE NATURE

CONCENTRATED ORCHITIC SOLUTION (ORCHITIC SUBSTANCE CONCENTRATED-COUSINEAU) NOT ACCEPTABLE FOR N. N. R.

Report of the Council on Pharmacy and Chemistry

The Council has authorized publication of the following report. W. A. PUCKNER, Secretary.

Concentrated Orchitic Solution, also called Orchitic Substance Concentrated (Cousineau), is marketed by the California Endocrine Foundation Laboratories, Long Beach, California. According to the label on the specimen submitted, it is "A Preparation of Orcho-Plasm Ramm Derivative." In the information sent to the Council, the preparation was stated to be "a chemical; is unaltered Orchitic tissue in aqueous suspension mildly preserved," containing one part of tissue to nine of water, and preserved by the use of alcohol in the proportion of one part of alcohol to nine of water, "slightly phenolized." The method of preparation was given thus:

"The manufacture is that of surgicalizing [*sic*] the animal acquiring tissue aseptically following which it is macerated, following this suspended in solution as above stated."

In the booklet, "Serologic Endocrinology," Concentrated Orchitic Solution it is said "consists of the small, hard, testicular gland of the healthy, young, live Goat, Ram or Monkey," and "contains saturation of the whole gland substance in solution ideally compounded." In this booklet also, Concentrated Orchitic Solution is "recommended as a homostimulant and for its dynamogenic action in acute, subacute and chronic diseases." Further on the pamphlet reads:

"Orchitic Substances Cousineau are recommended in all forms of diseases particularly the chronic, sub-acute and in the acute lung diseases. It changes the Serologic Index, prohibiting germ activity as Antitoxin in Diphtheria."

These statements are followed by the names of the following diseases, given in display type: "Asthma," "Dementia Praecox," "Dementia Senile-Toxic Psychosis," "Diabetes-Gangrene," "Diseases of the Kidneys," "Fibrosis of the Lungs," "Locomotor Ataxia," "Neurasthenia," "Paralysis Agitans," "Prostatic Disease," "Pulmonary Tuberculosis," "Rheumatism-Emphysema." In some cases a claim such as "Splendid results can be anticipated here" is made under the name of the disease. In others a mere reference is given to a "case report" for which the physician is urged to write. A later paragraph reads:

"In Malnutrition, Rickets, Anemias, Asthenia, Arthritis, High and Low Blood Pressures, Lung, Heart, Gastro-Intestinal, Kidney, Bladder, Prostatic, and Ovarian Disease the Concentrated Orchitic Solution is indicated."

Under the heading "Blood and Sero-Biologic Resume," the following somewhat vague and ambiguous claims are made for Concentrated Orchitic Solution "when applied Surgically and particularly Hypodermically":

"It raises the Red count from a few to a Million or more in the matter of a few hours very often. It will raise the Hemoglobin scale from very low to very high in the same period of time. The White Blood Cells tend to reduction in number but are given more vitality—more vigor. It tends to the rebalancing of Blood Pressures. When Low, raises the pressure frequently to the normal state of youth. When very High, often drops, sometimes to Normal. If not to Normal, when enough Gland is administered, tends downward."

"In the Tubercular: When administered in ample dose the elements that have to do with carburetion,—fusing the elements properly for transmission by the blood stream—are adjusted so that instead of deposition [*sic*] of the metallic salts in the lung or other tissue, these salts are deposited normally in the tissue where they belong, and, when metallic deposits actually do exist in the lung or other tissue, they are reabsorbed."

In addition to that given to the printed matter, consideration was given to a number of letters from physicians to the California Endocrine Foundation Laboratories, concerned chiefly with the firm's orchitic preparations. Some of the letters contain case reports given in the uncritical form characteristic of such communications and offering no evidence to show the real nature of the disease alleged to have been cured. Others of the letters deal with orders and prices of the material.

The Council finds Concentrated Orchitic Solution (Orchitic Substance-Cousineau) unacceptable for New and Nonofficial Remedies because of the unwarranted and unsupported claims that are advanced for the preparation.

When the preceding statement was sent to the California Endocrine Foundation Laboratories, the firm submitted a proposed revision of the booklet "Serologic Endocrinology." In the proposed revision many of the statements objected to by the Council were marked to be omitted, especially most of the recommendations for the use of the preparation in specific diseases. The impression, however, is still given that the product is effective in all manner of disease conditions. There remain such statements as: "Concentrated Orchitic Solution is recommended as a homostimulant and for its dynamogenic action in acute, sub-acute and chronic diseases." "It changes the Serologic Index, prohibiting germ activity as Antitoxin in Diphtheria"; "indicated in all forms of disease in man, woman and child. Super-Valuable in Lung, Heart, Kidney, Stomach, Prostate, Nervous and Ovarian diseases." The idea carried is that gland implants such as those of Voronoff are highly effective, and that the manufacturer's product, administered hypodermically, will give equally good or better results. Even if the revisions which the manufacturer offered to make in the booklet "Serologic Endocrinology" are made and his other advertising is similarly revised, the preparation is still unacceptable for the reason that he has not submitted any scientific evidence for the therapeutic usefulness and efficacy of the product.

The Council, therefore, declared Concentrated Orchitic Solution (Orchitic Substance Concentrated-Cousineau) unacceptable for New and Nonofficial Remedies and authorized publication of this statement.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

TREATMENT FOR ARTHRITIS

To the Editor:—Please give me the latest and most efficient treatment for neuritis and arthritis probably caused by focal infection from the prostate gland. The patient had a severe case of gonorrhea several years ago and now for many years has suffered from spondylitis. All other possible sources of infection have been eliminated. There are no local symptoms in the prostate gland except a slight tenderness on pressure.

AXEL W SWENSON, M.D., Van Nuys, Calif.

ANSWER.—It is probable that there is some active infection in the prostate and seminal vesicles at present which should receive appropriate treatment The arthritic changes are in part, if not wholly, definite anatomic changes in the bone which it is impossible to remove by any treatment, and the problem resolves itself into making the patient as comfortable as possible, and attempting to check any further progress. The treatment is almost entirely orthopedic and would depend altogether on the nature of the lesions.

THE A-MOY ANTI-FAT FAKE

To the Editor:—Will you please tell me the principle of the A-Moy method of reducing, gotten out by the A-Moy Company, 1029 South Wabash Avenue, Chicago? Please omit name. M.D., Maryland.

ANSWER.—The A-Moy Company is a trade name used by one Charles E. Cessna, of whom the Chicago *Tribune* once said, he "at different times in his business career has been a loan shark, patent medicine vendor, and land promoter." Cessna is well if unfavorably known to the medical profession by his activities as a mail-order quack. Prior to 1914 Cessna operated a fraud, the Dr. Joseph Lister & Company, a name that was abandoned when the federal authorities

commenced action against it. The business was continued under the name Dr. J. Russell Price Company, and under the latter name the government declared it a fraud and debarred it from the use of the United States mails. Cessna, who was graduated in medicine in 1885 and licensed to practice in Illinois in 1886, had his Illinois license revoked in September, 1918. Soon after the J. Russell Price fraud was put out of business Cessna started the National Laboratory and exploited "Nugatone," which he sold on the mail-order plan. This preparation contained corrosive mercuric chloride (corrosive sublimate), strychnine sulphate and arsenic trioxide, together with some less dangerous drugs. After children in different parts of the country had got hold of these pills and died from eating them, Cessna apparently changed the formula to one that was less deadly. Cessna's present antifat quackery consists in selling A-Moy Reducing Pills, which, according to a report that has come to this office, have been responsible for at least one death.

HYPODERMIC ADMINISTRATION OF MERCURIC CYANIDE

To the Editor:—Will you kindly supply me with information as to the result of a hypodermic administration of mercuric cyanide for the treatment of cataract. Also the technic of administering it.

FRANK J. SPILMAN, M.D., Connersville, Ind.

ANSWER.—Mercuric cyanide and oxycyanide have been used in the form of subconjunctival injections in incipient cataract for a great many years. Even the most ardent enthusiast of this treatment does not claim results, except in the very early stages. As to the efficacy of the treatment in preventing the progress of incipient cataract, opinion is divided. The majority of ophthalmologists have failed to obtain results. The solution is injected subconjunctivally in strengths that vary from 1:1,000 to 1:5,000. The amount varies with the individual operator. Some use as low as 0.6 cc. and others as much as 1 cc. Injections are made subconjunctivally and well toward the periphery.

SEBORRHEIC DERMATITIS

To the Editor:—A patient has had a seborrheic dermatitis of the chin for a year or more and I find it resistant to treatment. He has had patches on various parts of the body at different times but these have all cleared. He has consulted various skin specialists, all of whom prescribed sulphur in some form. He has had roentgen-ray and ultraviolet therapy, but the patch involving the chin remains. I have considered giving sodium thiosulphate intravenously, reasoning that sulphur internally may be more successful. I should like to know whether or not this is a rational procedure? If it is not rational, can you advise some treatment that will clear up the condition? Is it advisable for him to shave over this area? If published, please withhold my name. M.D., New York.

ANSWER.—The use of sodium thiosulphate intravenously would be an interesting experiment, fully justified by the difficulty of the case, the theoretical possibility of good result, and the harmlessness of the procedure. Other local applications that may benefit are those containing crude coal tar or other tars, resorcin, ammoniated mercury, or even mild amounts of chrysarobin. The scalp should be under constant treatment and the general resistance built up in every way possible.

DOSAGE OF DIGITALIS

To the Editor:—On page 157 of the third edition of Professor Osborne's book "Disturbances of the Heart," published by the American Medical Association, in speaking of the use of digitalis in cardiac decompensation, the author says: "If the tincture is used, the beginning dose should generally not be more than 5 drops, and it should not be repeated more frequently than once in eight hours. It is generally advisable, in two or three days, to increase this dose to 10 drops once in twelve hours, later perhaps to 15 drops twice a day, and still later to 20 drops once daily." Do you think one would ever get any digitalis effect, even if continued for an indefinite period, from such small doses? Is there any such thing as a "tonic" dose of digitalis? H. S. GEIGER, M.D., Kissimmee, Fla.

ANSWER.—Dr. Osborne writes: "In cardiac decompensation more important than digitalis is rest, a proper diet, and careful care of the bowels not by purging or by salines. During more than forty years of practice I have treated many cases of cardiac decompensation and have never thought it advisable to digitalize such a patient, and my method of administering digitalis has been as successful as one could expect, depending on the seriousness of that condition. It has never seemed wise to me to give such a heart the muscle shock of large doses of digitalis. We would never treat any other weakened muscle of the body in any such manner; we would strengthen it gradually. Also, large doses of digitalis that would cause symptoms of digitalis poisoning, especially vomiting, is the most serious thing that can happen to a patient who is suffering from cardiac decompensation.

"There is such a thing as a tonic dose of digitalis, as evidenced by hundreds of patients doing well on even 1 grain of digitalis leaves a day, who have symptoms of cardiac weakness if this dose is not administered. At the present time I prefer digitalis leaves to the tincture, but an assayed tincture acts very satisfactorily even in the small doses suggested.

"I wish to emphasize again the fact that digitalis is only a small part of the treatment of cardiac decompensation. Absolute rest is the most important part of the treatment."

VOMITING OF PREGNANCY

To the Editor:—Has a satisfactory technic been developed for preventing severe vomiting of pregnancy or for controlling the toxemias of pregnancy? Please use initials only. M.D., California.

ANSWER.—Severe vomiting of pregnancy and some other forms of toxemia may, in the majority of cases, be prevented by paying attention to and treating the early manifestations of toxemia. A careful physical examination should be made to see whether abnormalities are present, and these should be corrected if possible. If a woman vomits more than is usual in the early months of pregnancy, she should be advised to eat light meals every two or three hours, and the food should consist essentially of carbohydrates, vegetables and fruits. Water is preferably taken between meals. Attention should be directed to the bowels. Few drugs help, but phenobarbital and dilute hydrochloric acid have yielded good results in some cases. Suggestion helps considerably. When the vomiting becomes severe, the patient should be put to bed, large amounts of dextrose given intravenously, and fluids given subcutaneously or intravenously. Feeding through a duodenal tube is often helpful.

The severe forms of toxemia of the latter half of pregnancy can be prevented much more successfully than can hyperemesis. The chief indexes are the blood pressure and the urinary observations, but other important signs and symptoms are edema, headaches, marked constipation and oliguria. When the toxemia becomes worse, other and more alarming symptoms, such as vomiting, epigastric pain, jaundice and visual disturbances, appear. As soon as symptoms of toxemia become manifest, the diet should be so restricted that there is very little protein and very little salt in it. Eliminative measures should be instituted, dextrose should be administered subcutaneously or intravenously, and magnesium sulphate given intramuscularly or intravenously. It may be advisable to empty the uterus.

One must remember that hyperemesis and eclampsia, while preventable in the vast majority of cases, may sometimes occur despite the best of care.

MICA AS AN INDUSTRIAL HAZARD

To the Editor:—Would you kindly advise me from a public health point of view whether the existence of mica in the air in very visible and considerable quantities is detrimental to health? The question of discontinuing a mica plant in this town has arisen, and as the health officer here, I am investigating to see whether mica, besides being a nuisance, is a detriment to health. Please use initials only.

C. S. S., M.D., St. Regis Falls, N. Y.

ANSWER.—It is not known that any variety of mica dust acts as an intoxicant in the sense that lead dust is harmful. The harm to be anticipated from mica dusts largely results from its mechanical action, and this is related to the angulate qualities of the dust particles and to the quantity of dusts to which persons may be exposed. In grinding mica for the roofing industry, the process commonly employed is the dry grinding method, and the resulting particles are angulate or sharp-edged. In grinding mica for the wall paper industry the wet grinding method is preferable, owing to smoother particles resulting. The dry grinding method is thus a greater hazard for exposed persons.

In conditions of "very visible and considerable quantities" in the air, mica dust will act as a mechanical irritant to the respiratory passages, the eyes and the skin. It is believed that such a concentration of dust as specified will not exist over any widespread residential district near to a mica factory. However, wherever the concentration is as great as mentioned by our correspondent, the exposed population will present a higher respiratory disease incidence and eventually a number will present a fibrosis of lung tissues, simulating the pneumonoconiotic condition following long exposure to silica dusts.

Medical Education, Registration and Hospital Service

COMING EXAMINATIONS

AMERICAN BOARD FOR OPHTHALMIC EXAMINATIONS: Memphis, Nov. 14. Sec., Dr. William H. Wilder, 122 S. Michigan Ave., Chicago.

ARKANSAS: Little Rock, Nov. 8-9. Sec., Reg. Bd., Dr. J. W. Walker, Fayetteville; Sec., Eclec. Bd., Dr. C. E. Laws, Ft. Smith.

CALIFORNIA: Sacramento, Oct. 17-20. Sec., Dr. Chas. B. Pinkham, 906 Forum Bldg., Sacramento.

CONNECTICUT: Hartford, Nov. 8-9. Sec. Reg. Bd., Dr. Robert L. Rowley, 79 Elm St., Hartford. Sec., Homeopathic Bd., Dr. Edwin C. M. Hall, 82 Grand Ave., New Haven.

CONNECTICUT: State Board of Healing Arts, New Haven, Oct. 8. Prerequisite to examination. Chairman, Dr. Charles M. Bakewell, Box 1895, Yale Station, New Haven.

DISTRICT OF COLUMBIA: Washington, Oct. 11. Sec., Dr. Edgar P. Copeland, 1801 Eye St., Washington, D. C.

FLORIDA: Winter Haven, Nov. 14-15. Sec., Dr. W. M. Rowlett, 812 Citizens Bank Bldg., Tampa.

GEORGIA: Atlanta, Oct. 11-13. Sec., Dr. B. T. Wise, Plains.

IDAHO: Boise, Oct. 11. Commissioner of Law Enforcement, Hon. Fred E. Lukens, Boise.

KANSAS: Topeka, Oct. 11. Sec., Dr. A. S. Ross, Sabetha.

MAINE: Portland, Nov. 8-9. Sec., Dr. Adam P. Leighton, 192 State St., Portland.

MASSACHUSETTS: Boston, Nov. 8-10. Sec., Dr. Frank M. Vaughan, 144 State House, Boston.

MICHIGAN: Lansing, Oct. 11-13. Sec., Dr. Guy L. Connor, 707 Stroh Bldg., Detroit.

MINNESOTA: Minneapolis, Oct. 18-20. Sec., Dr. A. E. Comstock, 636 Lowry Bldg., St. Paul.

MISSOURI: Kansas City, Oct. 25-27. Sec., Dr. James Stewart, Jefferson City.

NEBRASKA: Lincoln, Oct. 31-Nov. 2. Sec., Mr. Lincoln Frost, Lincoln.

NEVADA: Carson City, Nov. 7. Sec., Dr. Edward E. Hamer, Carson City.

NEW JERSEY: Trenton, Oct. 18-19. Sec., Dr. Chas. B. Kelley, 1101 Trenton Trust Bldg., Trenton.

NEW MEXICO: Santa Fe, Oct. 10-11. Sec., Dr. W. T. Joyner, Roswell.

NORTH CAROLINA: Greensboro, Dec. 1. Sec., Dr. John W. MacConnell, Davidson.

SOUTH CAROLINA: Columbia, Nov. 8. Sec., Dr. A. Earle Boozer, 505 Saluda Ave, Columbia.

TEXAS: Fort Worth, Nov. 15-17. Sec., Dr. T. J. Crowe, 918-19 Mercantile Bank Bldg., Dallas.

WEST VIRGINIA: Morgantown, Nov. 22. Sec., Dr. W. T. Henshaw, New Capitol Bldg., Charleston.

Arizona April Examination

Dr. W. O. Sweek, secretary of the Arizona State Board of Medical Examiners, reports the written examination held on April 7-8, 1927, at Phoenix. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass in each subject. Of the 5 candidates who took the examination, 2 passed, and 3 failed. Six candidates were licensed by reciprocity. The following colleges were represented:

PASSED	Year Grad.	Per Cent
University of California Medical School	(1926)	87.2
Loyola University School of Medicine	(1925)	86.3

FAILED	Year Grad.	Per Cent
St. Louis College of Physicians and Surgeons	(1919)	55.7
University of West Tennessee Coll. of Med. and Surg.	(1918)	46.6
Tokyo Woman's Special Medical School	(1920)*	61.6

LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
College of Medical Evangelists	(1916)	California
Pacific Medical College, Los Angeles	(1916)†	Colorado
Atlanta Medical College	(1914)	Georgia
University of Wooster Medical Department	(1885)	Minnesota
Queen's University Faculty of Medicine	(1919)	Colorado
School of Medicine of the State of Michoacan de Ocampo, Mexico	(1917)	*Mexico

* Verification of graduation in process.
† Graduation not verified.

Louisiana June Examination

Dr. Roy B. Harrison, secretary of the Louisiana Board of Medical Examiners, reports the written examination held at New Orleans on June 9-11, 1927. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. Of the 78 candidates, 76 passed and 2 failed. Three candidates were granted licenses by reciprocity. The following colleges were represented:

PASSED	Year Grad.	Per Cent
University of Arkansas Medical School	(1905)	82.8
Howard University School of Medicine	(1927)	88.4
Tulane University School of Medicine	(1925) 91.7, (1926) 88.6, 89.9, (1927) 86, 88, 88.1, 88.1, 88.4, 88.7, 88.8, 88.8, 89, 89, 89.2, 89.3, 89.4, 89.4, 89.5, 89.5, 89.5, 89.7, 89.7, 89.7, 89.8, 89.8, 89.9, 90.3, 90.3, 90.3, 90.4, 90.4, 90.4, 90.4, 90.5, 90.6, 90.6, 90.7, 90.7, 90.8, 90.8, 90.9, 90.9, 91, 91, 91, 91, 91.2,* 91.2, 91.2, 91.3, 91.6, 91.7, 91.8, 91.8, 91.9, 91.9, 92.2, 92.2, 92.4, 92.5, 92.6, 92.6, 93.2, 93.2, 93.5, 93.6, 93.8		
St. Louis University School of Medicine	(1927)	86.1
University of Nebraska College of Medicine	(1926)	89.5
Memphis Hospital Medical College	(1901) 87.1, (1908)	75.7
University of Virginia Department of Medicine	(1924)	93.4
University of Vienna, Austria†	(1926)	91

FAILED	Year Grad.	Per Cent
St. Louis College of Physicians and Surgeons	(1918)	62.6
Memphis Hospital Medical College	(1910)	62.1

LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
State University of Iowa College of Medicine	(1924)	Iowa
Washington University School of Medicine	(1920)	Missouri
University of Texas Department of Medicine	(1918)	Texas

* Verification of graduation in process.
† Pending of citizenship.

Book Notices

THE SHIP-SURGEON'S HANDBOOK. By A. Vavasour Elder, D.S.C., M.R.C.S., L.R.C.P., Surgeon Lieutenant Commander, R. N. V. R. Third edition. Cloth. Price, $3.75. Pp. 523. New York: William Wood & Company, 1927.

When a physician enters the navy, as a rule he is not put aboard ship and abandoned, without help, to work out his own salvation. When he enters the merchant marine, however, he is cast loose alone as a rule, and although he knows much about medicine, surgery and obstetrics he generally knows little about the sea and less about ships. He is an officer of the ship, a practitioner to passengers and crew, and a public health official to all on board and to port officers. Frequently he is his own orderly, nurse, druggist and clerk. Whatever the post of ship surgeon may have been in the days of the buccaneers, it is now a job for a skilful physician, a firm but kindly officer, and a cultured gentleman. In 1906, this type of modern ship surgeon published the first edition of the "Ship-Surgeon's Handbook." The book had the unique position of being the only one devoted entirely to the work of a ship surgeon, and was written from the administrative rather than the clinical side of the work. Since that time the author has had twenty years of experience at sea, and the present edition is a clinical as well as an administrative guide. Given this one small book and a knowledge of medicine, and the newly appointed ship surgeon could order his supplies, uniform himself and carry on his professional and administrative work with credit. The easy, cultured style, dry humor and occasional anecdote hold the attention of any physician who has ever been to sea or who has ever been connected with maritime affairs.

ANLEITUNG ZUR DIATHERMIEBEHANDLUNG. Von Dr. G. Bucky. Second edition. Paper. Price, 6 marks. Pp. 200, with 132 illustrations. Berlin: Urban & Schwarzenberg, 1927.

The present edition has been expanded by the inclusion of a timely discussion on the relative value of dry versus moist electrodes. The author is of the opinion that moist electrodes are less useful than dry electrodes. This, no doubt, is a revolutionary thought among the European practitioners in physical therapy, who are still utilizing the moist pad electrode in diathermy application. It is equally surprising to the American physician oriented to this specialty that anything approaching polemic discussion is necessary to convince one of the greater effectiveness of the dry metal electrode. It is to be hoped that this section of the book will receive appreciative acceptance among the profession abroad. In the discussion of the physics of high frequency currents, it is interesting to record that the author is fully cognizant of the difference between a diathermic and a d'Arsonval current. This difference, not fully appreciated by the local student in physical therapy and less by the average manufacturer of diathermic apparatus, has led to confusion in nomenclature and in application. The clear discussion of dosage, technic and application of electrodes, and the prevention of burns and other accidents that frequently follow the careless or mis-

understood mechanics of specialized electrical currents indicates detailed effort and is apparently based on authoritative experience. Schematic drawings that illustrate ideas are at best only idealized concepts and prove only that which the author wishes to prove. The incorporation of such illustrations in this volume to prove the directional flow of the current and its concentration, where electrical energies are absorbed into vital tissue, must be, therefore, accepted with reservation. One must remember that the tissues of the body are made up of heterogeneous resistances, and that the current flow may be shunted or concentrated into less or more resisting parts. It is to be regretted that a fuller exposition on surgical diathermy was not incorported in the present edition. One cannot help but feel that this was a neglected opportunity to give the book a more rounded balance. As it is, there is a suspicion that the abbreviated section on surgical diathermy was merely an afterthought. In spite of the conservative tone of the book, there is not sufficient corroborative evidence from outside sources and more recent investigations to warrant total acceptance regarding the beneficial effect of diathermy in some of the alphabetically enumerated diseases. There is a thread of adventurous optimism running through this well conceived exposition that carries with it double edged interpretations. The novice and the desultory reader will find much that is fascinating in theory but frequently disappointing in practice. The specialized reader will find much food for thought and appreciative criticism, and will be the gainer because of his ability to separate the wheat from the chaff, the practical from the fantastic. The author, however, has succeeded in packing an immense amount of information into the compass of the small volume.

A SURVEY OF AMERICAN CHEMISTRY. Volume I. July 1, 1925, to July 1, 1926. Including Reports from Scientific Committees, Division of Chemistry and Chemical Technology, National Research Council. Edited by William J. Hale, Chairman of the Division, in Cooperation with Clarence J. West, Chairman, Committee on Publications and Publicity, National Research Council. Cloth. Price, $2. Pp. 257. New York: Chemical Catalog Company, Inc., 1927.

This volume is a compilation of the more important chemical researches reported by American chemists from July 1, 1925, to June 30, 1926. It contains twenty-four chapters. Twenty-three of these classify the different researches under as many heads. The twenty-fourth chapter is a treatise entitled, "Cooperative Research Between Industries and Universities," by the editor. The individual descriptions are necessarily very short. In general, they give just sufficient information so that the reader will know whether or not he wishes to go to the original. The bibliography makes the volume a valuable means of reference to recent work.

ATLAS DER HAUT- UND GESCHLECHTSKRANKHEITEN ZUGLEICH EIN LEHRBUCH. Von Professor Dr. W. Frieboes, Direktor der dermatologischen Universitätsklinik, Rostock. Lieferung 1. Paper. Price, 10 marks. Pp. 48, with 678 illustrations. Leipsic: F. C. W. Vogel, 1927.

This is the first fasciculus, of which fourteen are to appear, of an illustrated treatise on skin diseases by Professor Frieboes. It in fact justifies the title of a combined textbook and atlas. The format is particularly proper for such a work. It is a small quarto page and this fasciculus consists of forty-eight pages. If the other fasciculi average the same, the whole will be an atlas and handbook of approximately 700 pages—a very ambitious work of this sort.

The text of this fasciculus takes up only the general principles of dermatology and a part of the subject of eczema. The principles of dermatology are intelligently and logically developed, but too briefly. This part, however, does prove the scholarship of the author in the satisfactory way he meets the difficult task of making a good elementary summary. The text in general will undoubtedly be a scholarly exposition of contemporary dermatology.

It is a fine sample of the printer's art. The text is on soft fine paper in legible but not too large type. The illustrations are on heavy glazed paper and are tipped in. As is usual in looking over the colored plates produced on the continent, our envy is excited. They are excellent beyond anything that we can do in large numbers in this country. Of course, the reason is economic. One reason is the expensiveness of producing the illustrations, but we can produce them if they are furnished to us. The real difficulty that we have is in getting the original illustrations from which to make the reproductions. The artists are not available to make them. Our best illustrations are made with color photographs, and they cannot equal these beautiful paintings. The colored illustrations in this volume reach as high a standard of excellence as anything we know. They are well selected for instruction purposes, and they are just about as lifelike as the originals.

The price of this fasciculus, 10 marks, indicates that the entire work will be 140 marks, or about $33.50. In view of the excellence of the work as an atlas this is not too much. Unfortunately, most of the German works now being offered seem excessive in price.

CERTAIN SAMARITANS. By Esther Pohl Lovejoy. Cloth. Price, $3.50. Pp. 302, with illustrations. New York: Macmillan Company, 1927.

This book recounts the work done by the American Women's Hospitals in Europe and Asia, during and following the World War. It relates first hand experiences, substantiated by history, statistics, and extracts from reports. The opening chapters tell of the origin of the American Women's Hospitals and a little of the work done in Europe during the war. An account of the efforts in the Balkans and Armenia follows. The second and more impressive half of the book is devoted to the work done among the Christian refugees in the Near East. In September, 1922, Turkey expelled all Christians. Thus more than 1,500,000 people were compelled to leave their homes or face death or deportation to the interior. Greece was the only country that would admit them; and so, a flood of Christian outcasts poured on the Aegean Islands and then on into Macedonia and Thrace. Soon, however, the assimilating power of Greece was reached, and as the country was threatened with overwhelming infection and disease the government was compelled to close the ports. Still thousands of people were left crowded on board ship in the Mediterranean, suffering from shortage of food and water. Typhus and smallpox, furthermore, soon were raging among them. Finally the Greek government agreed to allow pest ships to land refugees on barren and waterless Macronissi Island and to furnish water, fuel and transportation, provided some organization would establish a quarantine station with isolation hospitals and would assume all further responsibility. The American Women's Hospitals did not see how the financial obligations could be met but undertook the task and carried it through. It also established hospitals on the Islands of Crete, Chios and Mitylene and later followed the refugees on to the mainland of Greece, where it helped them especially along medical and sanitary lines. At the time of the writing of the book these hospitals, dispensaries, clinics and relief stations were still functioning. Dr. Lovejoy was chairman of the board directing the American Women's Hospitals, from 1919 to 1922. She visited the stations personally and carried much of the financial and executive responsibility. She knew her work thoroughly, and her book brings it strikingly to the reader.

TOXICOMANÍAS. Por el Dr. Gregorio Bermann, Profesor de la Facultad de Medicina de Córdoba. Paper. Pp. 382. Buenos Aires, 1926.

Those fond of finding some relation between dry laws and the increasing use of habit-forming drugs, particularly after the Great War, will find little comfort in the thorough study devoted to the narcotic evil by this Argentine professor. Dr. Bermann's survey centered in Argentina, and especially Córdoba, but many facts and conclusions have a universal bearing. Drug addicts always prevailed to some extent in Córdoba, although the practice actually reached the category of an extended evil about 1916-1917. At Córdoba, the habitué rate may reach 2.5 per thousand in a population of 200,000, while in Buenos Aires it is even higher, 3 per thousand among 2,000,000 people. Dr. Bermann rightly takes exception to the figures of 4,000,000 addicts claimed by some authors for the United States, but he seems inclined to accept 1,000,000, while the careful studies of the Public Health Service point to a present maximum of 150,000. Dr. Bermann takes up successively the different drugs, opium in the East, coca in America, hashish, henbane, arsenic and alcohol,

and delves entertainingly into history and literature. An interesting reference to Tolstoy's essay on alcohol and tobacco exhibits the Russian novelist in the light of a forerunner of psychoanalysis. A valuable chapter deals with the use of coca by South American Indians since precolumbian times, and a sentence made timely by recent events points out that Bolivian natives become almost wild beasts when they take alcohol on top of coca. After grouping the different kinds of habitués the author turns to the medicosocial aspect of the question, some curious criminal cases being quoted. The last part of the book is devoted to a study of measures in force and the suggestion of remedies, from both a preventive and a therapeutic standpoint.

PIONEER MEDICINE IN WESTERN PENNSYLVANIA. By Theodore Diller, M.D., with a foreword by J. J. Buchanan, M.D. Cloth. Price, $3. Pp. 230, with 26 illustrations. New York: Paul B. Hoeber, Inc., 1927.

In this well printed volume the author records an investigation of early medicine in western Pennsylvania, beginning with 1754, when that, among other parts of the United States, was largely a military population. As time passed, civilians began to come into practice. It was not long before the community was supplied with physicians who had been born in western Pennsylvania. It was likewise not infrequent for the parson to serve double duty as physician and priest. One of Dr. Diller's most interesting chapters concerns three such contributors to pioneer days in his section. The book is quite complete, covering all the aspects of medical professional life and including numerous fine illustrations of Pennsylvania pioneers.

LES RADIATIONS LUMINEUSES EN PHYSIOLOGIE ET EN THÉRAPEUTIQUE. De l'infra-rouge à l'ultra-violet. Par. A.-C. Guillaume. Paper. Price, 40 francs. Pp. 508, with illustrations. Paris: Masson & Cie, 1927.

In this book, following a general discussion on the physics of light, under which heading the author includes infra-red, visible radiation and ultraviolet radiation, an analysis and a review reflecting the author's opinion of the commonly used sources of ultraviolet radiation, of light and of infra-red is discussed. This section of the work does not differ in scope or in accuracy from the general information usually found in the average book dealing with this subject. Next, some sections are devoted to the effects produced on the skin in consequence of absorption of these radiations. From this material the theme is developed that light exerts two general actions: biochemical and calorific. The human organism, according to the author, develops a biologic protection against infra-red, visible light and ultraviolet radiation. The remainder of the book is devoted to an expansion of the various themes developed by the author and leads finally to a concluding section which is more or less philosophical or metaphysical. A great number of references are quoted throughout the book. Indeed, the text represents an encyclopedic digest of an exhaustive bibliography; and since many of the bibliographic references are in the main the work of well known investigators, it follows that the material is a good summary of the existing knowledge of the physiologic and therapeutic possibilities of infra-red, visible light and ultraviolet radiation. The chief objection to the work as a whole is the frequent lack of properly controlled experimental data as a basis for the many premises which the author assumes.

PYORRHŒA ALVEOLARIS. Its Ætiology, Pathology, Symptoms, Sequelae and Treatment. By F. St. J. Steadman, D.P.H., L.R.C.P., M.R.C.S., Dental Surgeon and Lecturer on Dental Disease in Children, Local Anæsthesia and Bacteriology, Royal Dental Hospital. Cloth. Price, $9.25. Pp. 263, with 78 illustrations. St. Louis: C. V. Mosby Company, 1927.

The need for a standardized terminology and universally acceptable description and definition for the disease known as pyorrhea alveolaris becomes apparent in reading Mr. Steadman's interesting work. The lack of agreement with the author's conclusions will be due, largely, to the differences in definitions. If the condition described by him as the germ-carbohydrate type of pyorrhea is accepted as such, his deduction that it is primarily a disease of childhood must be admitted. If his premises are questioned, the conclusions will fall of their own weight. He gives as the causation a carbohydrate diet, especially sugar, and mouth breathing. Will the author's classification as pyorrhea of the disease known as trench mouth, or Vincent infection, be accepted? Are phagedenic gingivitis, which is an acute infectious process, rapid in development, always caused by the same micro-organism, and the slowly developing, chronic disease of undetermined origin two variations of the same disease? For treatment the author uses pure phenol. He does not suggest topical applications of neoarsphenamine, which our clinicians regard almost a specific for this type of infection. Mr. Steadman gives an excellent description of the atrophic or dry pyorrhea. His suggestions in examining patients are helpful. He calls attention to the fact that frequently the gums on the labial aspect appear normal, but on the lingual surface deep pockets will be found, especially in the region of the incisors. Local injuries and "traumatic occlusion" are the possible causes of this disease. For general treatment he advises scaling, excision of pockets, practiced by some of our clinicians, and ionic medication, which is almost obsolete in this country. Mr. Steadman does not suggest thorough polishing of the teeth, a procedure considered indispensable by most of our practitioners. Space will not allow a detailed discussion of Mr. Steadman's therapy; but the author is less persistent in his efforts to save the teeth of young adults than of old people, though the reverse procedure would seem more rational. A good part of the book is devoted to a review of diseases that may be secondary to oral sepsis. The descriptions are clear and concise; the proof that they are of oral origin, insufficient. In the chapters on preventive treatment the author advises the extraction of all deciduous teeth and six year molars that have exposed pulps. This practice will not be universally adopted.

LEHRBUCH DER MASSAGE. Band I: Die funktionellen Erkrankungen des Bewegungsapparates und die Theorie der Massage. Band II: Die Technik der Massage des Bewegungsapparates, der männlichen und weiblichen Beckenhöhle. Second edition. Paper. Price, 20 marks, and 30 marks, or the two volumes for 45 m. Pp. 992, with 448 illustrations. Bonn: A. Marcus & E. Weber, 1927.

This is the second edition of a massive work on massage in medical practice. The art which has been known to mankind since the earliest times has been developed coincidentally with our knowledge of anatomy and physiology, so that modern treatment of the tissues by this method is based on the fundamental sciences. The indications and contra-indications to massage are concerned with the pathology of the tissues to be treated. It is, for instance, an aphorism that an inflamed muscle should not be manipulated. The technic of massage of various portions of the body is thoroughly elaborated in this work. The effects of massage on the circulation of the blood and on the muscle tonus of various portions of the body is likewise indicated. Obviously, a part of the difficulty of evaluating this method of treatment is the fact that few diseases are treated by massage alone. A part of the special technic developed by this author concerns the massage of the anal sphincter and other regions in which the application of massage may be said to be for the present quite experimental. The second volume of the work is devoted almost wholly to technic, the procedures being given quite briefly and illustrated with excellent diagrams.

A TEXT-BOOK OF PATHOLOGY. By Alfred Stengel, M.D., Sc.D., Professor of Medicine at the University of Pennsylvania, and Herbert Fox, M.D., Professor of Comparative Pathology, and Director of the Pepper Laboratory of Clinical Medicine, University of Pennsylvania. Eighth edition. Cloth. Price, $10. Pp. 1138, with 570 illustrations. Philadelphia: W. B. Saunders Company, 1927.

In its broadest sense, the purpose of pathology, the authors say, is to explain the origin and beginning of lesions, to point out the compensatory arrangements, and to indicate the ultimate outcome of the process. The student must not be satisfied with thinking that a diagnosis depends on what may be seen under a microscope or on a kymograph, but must be a student of anatomy, of physiology and of chemistry in all its branches. This book, therefore, considers the subject of pathology from a broad point of view. Preceding the pages on beriberi, scurvy and pellagra there is a short discussion of vitamins A, B and C, but no mention, apparently, of the more recently discovered vitamins D and E. A book which has passed into its eighth edition and which has been pub-

lished over a period of almost thirty years of course summarizes practically all knowledge that is considered of sufficient importance for a permanent record. When such a book adds also infrequent observations, its value is further enhanced. Thus, under the subject of embolism it is said that rarely dust particles may enter the blood vessels in the lung directly by penetration. Small particles of coal, iron, marble or clay may gain access to the circulation in the form of dust particles when the bronchial lymph glands are surcharged or by rupture of the gland into a neighboring vein. The authors say that the Bordet-Gengou bacillus is now accepted as constantly present in cases of whooping cough. They discuss tularemia, which has only recently found a place in medical literature. They devote only a few lines to dengue, too few, it would seem, in view of the extensive outbreaks that occasionally occur in parts of this country. There are many illustrations, some in color and many unusually instructive. Possibly the authors could have omitted a few illustrations without lessening the value of the book. Their effort was partly directed to keeping it within reasonable proportions as to size, and they have succeeded. Although considerable material has been added, by careful arrangement it is less bulky than the usual volume on general pathology.

THE THOMAS SPLINT AND ITS MODIFICATIONS IN THE TREATMENT OF FRACTURES. By Meurice Sinclair, C.M.G., M.B., Ch.B. With a foreword by Sir Robert Jones, K.B.E., C.B., F.R.C.S. Cloth. Price, $4.50. Pp. 168, with illustrations. London: Oxford University Press, 1927.

The ground work of this monograph is the work of the late Hugh Owen Thomas, and more particularly the principles of his knee-joint splint. The British mortality from shock in cases of compound fracture of the femur was reduced from 80 per cent in 1916 to 15.6 per cent in 1917, chiefly as the result of the immobilization secured by the early application of the Thomas splint. The author has considered every detail of the apparatus, which is described from the standpoint of efficiency and comfort. The accuracy of the adjustment of deformity and the action of mechanical devices designed to lessen the burden of suffering were important factors in obtaining good results and in maintaining the morale of the soldiers. In the preliminary consideration the author gives a concise account of these important factors in the consideration of fractures. He describes the position of election for ankylosis of the various important joints. First aid treatment is given in detail. The methods used to secure alinement traction and immobilization are those so successfully used by the author during the late war. The application of the Thomas knee splints to fractures of the lower extremity is given in great detail and is illustrated by excellent photographs. Fractures of the bones of the upper extremities are considered and the various types are illustrated. There is a chapter on the wounds of the soft tissues. The author emphasizes the importance of careful study of good roentgen-ray films. In the appendix the specifications of the Thomas knee splint are given in great detail, as is the author's splint box for the arm and leg. Methods for applying Sinclair's glue or gelatin are given and there is an elaborate table of materials required in the treatment of various fractures. The subject is very well handled, and the illustrations are on the whole excellent. It is a book to be recommended to every one doing industrial or traumatic surgery.

NURSES AND NURSING. By Alfred Worcester, A.M., M.D., Professor of Hygiene in Harvard University. Cloth. Price, $2. Pp. 173. Cambridge: Harvard University Press, 1927.

In this volume are included a number of essays on nurse training both in this country and abroad. Dr. Worcester emphasizes the relationship of the physician to nurse training, since the nurse must inevitably serve under medical direction. He is inclined to see the need of nurse training in the home as well as in the hospital, something similar perhaps to the necessity for preceptorship in the training of the physician. Ideals that have animated the nursing profession beginning with Florence Nightingale are here held up repeatedly to the nurses of the future. Dr. Worcester's views are based on many years of medical practice. He writes simply and artistically. The book is so well printed that it would constitute a desirable gift for any nurse.

DIE GONORRHOE DES WEIBES: Ein Lehrbuch für Ärzte und Studierende. Von Dr. R. Franz, Privatdozent an der Universität am Maria Theresa-Frauenhospital in Wien. Paper. Price, 12 marks. Pp. 193, with 43 illustrations. Vienna: Julius Springer, 1927.

Franz covers adequately the subject of gonorrhea in the female, epitomizing the European literature and practice. Obviously, the European point of view of this infection has remained the same, while American students have given a new and somewhat different perspective. For instance, gonorrheal endometritis is considered at some length and the treatment by intra-uterine instillation of silver salts is described. American authors, not quoted by Franz, teach that gonorrhea infects the endocervix and endosalpinx and that it usually passes over the endometrium without causing an inflammatory lesion. Intra-uterine treatment is usually not only unnecessary but often the means of carrying infectious material from the cervix to the endosalpinx. Under treatment of gonorrhea, the author considers local application, vaccine and protein therapy—the latter at great length—heat, light and hydrotherapy, massage and pressure, diathermy, radiotherapy and surgical treatment. The two measures so popular with American gynecologists, applications of mercurochrome-220 soluble and the use of linear cauterization of the chronically infected endocervix, are not considered. In fact, the cervix receives the least attention, whereas in practice it requires the keenest scrutiny and painstaking therapy, since it is the accessible and most commonly infected portion of the female genitalia.

STANDARD METHODS OF THE DIVISION OF LABORATORIES AND RESEARCH OF THE NEW YORK STATE DEPARTMENT OF HEALTH. General Laboratory Procedures and the Methods Used in the Department for the Preparation of Media and Glassware, the Laboratories for Sanitary and Analytical Chemistry, the Research, Publications, and Library Department, the Antitoxin, Serum, and Vaccine Laboratories, the Diagnostic Laboratories, the Executive Offices. Augustus B. Wadsworth, M.D., Director. Cloth. Price, $7.50. Pp. 704, with illustrations. Baltimore: Williams & Wilkins Company, 1927.

That portion of the review of a large scientific work which deals with scope and intention is frequently best stated in the words of the compilers. This is true in the present instance:

> The methods, which incidentally are a record of the laboratory's progress up to the present time in formulating precise procedures for the conduct of the work, are published for a threefold purpose: to keep uniform the established methods; to instruct the new workers and prescribe exact procedures for him and for those who are unable to take independent responsibility; and to serve as a guide to the policy which the trained, responsible workers may follow or depart from as the immediate situation demands.
>
> During the past ten years, these methods have been so continually revised and improved that printed copies are now necessary not only for further revision but to meet the requests for copies from other laboratories engaged in similar work. The extent of the detail is the result of experience in guarding against error. Each series of methods is a unit in itself, and does not necessarily conform to the others in arrangement or in the amount of detail it contains. . . .
>
> The methods for the examination of water, sewage, ice and milk in the laboratories for sanitary and analytical chemistry are practically the same as those prepared by the American Public Health Association, and have merely been slightly modified to meet special conditions. . . . Owing to the lack of definite knowledge concerning the nature and interaction of the bacterial poisons and their antitoxins or antisera, there is a great deal of empiricism in laboratory practice in this field; and the results of research, which has everywhere been directed to the study of prophylactic and therapeutic agents, have necessitated repeated modifications of the methods prescribed.

Properly to estimate the value to outsiders of this voluminous handbook, it would be necessary to have it on the laboratory shelf and to attempt to apply its methods in daily practice at the bench. Such tried judgment is impossible in the case of a book recently issued. A general survey of the volume, however, made in the light of experience in a large laboratory, indicates that it will take its place among those works which are indispensable to the scientific, executive and general service personnel of clinical and public health laboratories. With the exception of certain procedures at present awaiting universal adoption (such as the Kahn test), it seems to contain everything that one would need to look up. With this on the table, one can abandon many pages of unindexed personal notes and much searching through lesser books, periodicals and monographs.

Miscellany

THE STATUS OF STATISTICAL MEDICINE*

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Statistical medicine may be defined as the process of collection, adequate tabulation and comprehensive analysis of medical facts. Within the last decade it has come to occupy a place of prominence in medical journals. It owes its growth to the extensive use of quantitative methods of study and the accumulation of large amounts of scientific data. Already most of the basic medical sciences consider that statistical technic is an essential tool in the analysis of laboratory results.

The necessity for statistical analysis arises because the human mind is unable to grasp the significance of the individual in mass data. It is difficult to visualize detail. One might, for instance, completely comprehend the heights of three individuals in a room. Increase the group to a hundred. In order to obtain a mental picture of the group, one is forced to compute an average or possibly some measure of variation of the individual heights. An average, however, is a statistical procedure. Therefore, even in this simple example it is necessary to use the statistical method in order to obtain a concrete picture.

Clinical medicine has not yet yielded to this modern trend. Adequate application of biometric methods to clinical records is not possible because the relation between physician and patient is too individualistic. The clinician regards with jealous eye any attempt to standardize the case record. The need for standardized medical forms has been keenly felt, however, and numerous attempts have been made to remedy the situation. At the present time in the United States, the American College of Surgeons sponsors a group of case record forms. The American Hospital Association has struggled with the subject and a special "Committee of Accounting and Records" has developed a series of charts dealing with hospital activities of all types. The commercial Hospital Standard Publishing Company has edited a catalogue of Standard Hospital Charts used by the leading hospitals in America. The National Tuberculosis Association has attempted to solve the same problem, so far without much success. The Association for Prevention and Relief of Heart Disease has developed an exceptional and detailed chart for use in heart clinics. Special committees from almost every field of medicine have wrestled with the problem at one time or another. Almost uniformly they have failed partially or completely in their object.

Why do these efforts at standardization fail? The most important cause arises from the neglect by the committees in laying down for the formulation of such charts a set of criteria that will meet the needs of statistical medicine. Standardized medical forms are conceived in the hope of scientific progress. Statistical medicine is born as a result of this conception. It must be fed by the proper type of facts if it is to follow the normal law of growth.

The one essential difference between the present clinical chart and one that would be desirable for statistical purposes rests in the definition of the word completeness. Completeness to the clinician signifies notation of every detail pertaining to the positive facts about the case. Completeness to the statistician means positive and *negative* information for *every single item* that is of sufficient consequence to enter into the picture of the disease. It is impossible to apply the laws of probability unless the true probabilities are known.

If negative and positive information are both known for a series of patients, a "master tabulation" can be made from the data. For illustration, 843 patients studied by Dr. H. H. Young at the Brady Urological Institute were grouped by me into two classes, the first with moderately enlarged prostates and the second with extremely enlarged prostates. In each instance the history of retention and the type of onset were known.

TABLE A

	No. of Cases	Retention	No Retention	Sudden Onset	Gradual Onset
Moderately enlarged....	780	(1) 59%	(3) 50%	(5) 7%	(7) 93%
Extremely enlarged.....	63	(2) 56%	(4) 44%	(6) 15%	(8) 85%
Total.....	843				

TABLE B

		Retention		No Retention		
	No. of Cases	Sudden Onset	Gradual Onset	Sudden Onset	Gradual Onset	Total
Moderately enlarged...	780	(1) 5%	(3) 45%	(5) 2%	(7) 48%	100%
Extremely enlarged....	63	(2) 13%	(4) 43%	(6) 2%	(8) 42%	100%
Total.....	843					

Tabulation A has taken just as much space as B. However, there are certain questions which cannot be answered by A that can be by B. These may be listed as follows:

Table A (Cell No. Noted)	Possible Questions	Table B (Cell No. Noted)
	Percentage of	
1	Retention, moderate	1 and 3
2	Retention, extreme	2 and 4
3	No retention, moderate	5 and 7
4	No retention, extreme	6 and 8
5	Sudden onset, moderate	1 and 5
6	Sudden onset, extreme	2 and 6
7	Gradual onset, moderate	3 and 7
8	Gradual onset, extreme	4 and 8
	Retention and sudden onset, moderate	1
	Retention and sudden onset, extreme	2
	Retention and gradual onset, moderate	3
	Retention and gradual onset, extreme	4
	No retention and sudden onset, moderate	5
	No retention and sudden onset, extreme	6
	No retention and gradual onset, moderate	7
	No retention and gradual onset, extreme	8

Eight additional questions are evident in master table B which have not been and cannot be answered in table A. It is obviously impossible to form table B unless all information, both negative and positive, is known on each one of the 843 individuals.

Before starting any large tabulation task it is helpful to determine the scope of the problem by computing the total possible number of cells that are available in the master table. The calculation of the total number is the product of each set of mutually exclusive compartments in the table. In this instance, for size of prostate there are two cells; retention, two; onset, two; therefore the product limits the complexity of the master table to 8 cells.

Criteria for an ideal clinical record should take into consideration the demands of statistical medicine as well as those of the clinician. The following criteria are suggested as a minimum requirement:

1. It should be individualistic and personal with proper sequence.
2. It should facilitate notation.
3. It should yield information readily.

* From the Department of Biometry and Vital Statistics, School of Hygiene and Public Health, Johns Hopkins University, No. 128.

4. It should be accurate. Accuracy depends on the truthfulness and the competence of the examiner or both. By truthfulness is meant notation of only those facts derived from questions or examinations actually conducted. Negative observations which are recorded without being sufficiently investigated distort the statistical picture of disease.

5. It should be legible.

6. It should be sufficiently elastic to meet all demands.

7. It must be complete. Pertinent negative and positive data should be included.

The physician demands that all seven of these items should be present in his ideal clinical record. His interpretation of completeness ordinarily is limited to positive information. The qualifications that satisfy the needs of statistical medicine are numbers 3, 4, 5, 6 and 7. The individual and personal features are not essential in the use of the statistical chart. Moreover, the physician's time frequently is considered to be a matter of slight importance from the standpoint of the statistician. Perhaps these two facts account in a large measure for the failure of the statistical and purely clinical group to work in unison. On the other hand, statistical research of any type demands that the criteria "completeness," which both groups deem important, must be interpreted literally and applied rigidly.[1]

It is inconceivable to me that two sets of criteria which are so nearly identical, the one for the use of the clinician for his patient and the other for the clinician interested in scientific progress, cannot be made agreeable to both groups. There is certainly no necessity that statistical notation should amplify the labor of recording medical data. As a matter of fact, it can be made to minimize such labor. There is likewise no excuse for the pure clinician to refuse to tabulate his facts in an orderly and complete fashion, since by doing this he best serves his patient and at the same time aids in the progress of medicine. A widespread attitude is that "the statistician should pick out his own data and not expect others to do work which is of value to no one else." This is unfortunate. In the first place, present medical data are not tabulated in a manner suitable for the statistician's use. In the second place, he would find it difficult to analyze if it were properly recorded because he usually lacks the medical training to apply it to the best advantage. Mathematical statistical methods afford a wonderful analytic tool, ready made, for medical investigators. But it is only a tool. To yield the best results it should be used by the clinician and not by the medically untrained statistician.

1. Criticism, to be constructive, should offer a substitute for an undesirable element. Considerable progress has been made with the help of Dr. Reed Rockwood of the University of Maryland in formulating a satisfactory chart conforming to the standard given above. This is being subjected to trial at the present time.

Mobile Clinic in Colorado.—A mobile clinic has proved to be of great value in the educational program of the Colorado State Psychopathic Hospital. Through the mobile clinic actual contacts are made with the communities from which patients are referred to the hospital, a better understanding of the social forces at work in each community is made possible, and more accurate recommendations can be given at the time of discharging patients. The mobile clinic not only makes possible the examination of a large number of persons, many of whom are later referred to the hospital for treatment and observation, but also is a means of educating the community to an understanding of the purposes and functions of the hospital and the principles of mental hygiene. A mobile clinic should serve as a nucleus for a follow-up system and for the organization of mental hygiene clinics in the larger communities of the state. It also should pave the way for an active state society for mental hygiene.—Ebaugh, F. G., and Lloyd, Ruth: Program of a State Psychopathic Hospital, *Mental Hygiene* **11**:356 (April) 1927.

Medicolegal

Construction of Ambiguous Statute as to Abortions

(State v. Rudman (Me.), 136 Atl. R. 817)

The Supreme Judicial Court of Maine, in overruling exceptions to the conviction of the respondent physician of attempted abortion, says that chapter 153 of the public laws of 1921, amending section 9 of chapter 126 of the revised statutes of that state, provides:

"Whoever administers to any woman pregnant with child, whether such child is quick or not, any medicine, drug or other substance, or uses any instrument or other means, unless the same was done as necessary for the preservation of the mother's life, shall be punished, if done with intent to destroy such child and thereby it was destroyed before birth," etc.

The language of the statute is somewhat unusual in context and its grammatical relations, and, so far as a careful examination discloses, varies in important details from similar statutes of the other states, except Illinois. The exception in the Maine statute is written, "unless the same was done as necessary for the preservation of the mother's life." To what does "same" refer? The unlawful or overt act prohibited is the administration of medicine, etc., or the "use of any instrument or other means." The evil intent essential to the crime charged is stated at the end of the section to be, "if done with intent to procure the miscarriage of such woman." The offense is complete when an overt act is done with the intent defined by the statute, unless the act falls within the exception. Context and phraseology convince this court that the phrase "unless the same was done" finds its antecedent in the unlawful acts enumerated rather than in the evil intent which must concur. This court is convinced that the contention was untenable that the indictment was insufficient because it did not allege that the miscarriage therein referred to was not necessary to preserve the life of the woman, but alleged, "it not being necessary for the preservation of the life of the said Jennie Gilbert to use said instrument as aforesaid."

Again, the indictment was assailed because it contained this last allegation, whereas the statutory language is, "unless the same was done as necessary for the preservation of the mother's life." It was argued that under this statutory exception necessity in fact for the preservation of the mother's life need not be established. It was insisted that good faith is a defense, and that a proper construction of the words of the statute left the question open as to whether or not the person who operated considered it necessary when done. But this court is not prepared to subscribe to such an interpretation of this act. The history, purpose and need of criminal legislation prohibiting this offense militate against such a doctrine. The language of the act itself falls short of indicating a legislative intent thus to open the bars raised against the crime. Abortion and attempts to procure a miscarriage are common offenses, and by no means confined to the members of the medical profession. Court records evidence such practices among laymen of both sexes, and the application of this statute cannot be viewed from the physician's standpoint alone.

It is well known that occasion arises where, in the exercise of proper surgical advice and care, it becomes necessary, in order to save the mother's life, to remove the unborn fetus. To such highly honorable and proper acts, in accord with the highest ethics of the medical profession, the dictates of humanity, and all legal precepts, the statute has, and can have, no application. But to the destruction of unborn life for reasons, whatever they may be, other than necessity to save the mother's life, the law is intended, this court believes, to be an express and absolute prohibition. In the plain meaning of the statute this court's conclusion is verified. An accepted definition of the conjunction "as" is "because," "since," "it being the case that." If substitution be made, and the statute read "unless the same was done 'because' (or) 'since it was' (or) 'it being the case that it was' necessary," no ambiguity remains and the legislative intent is clear.

It is stated in the text that it is always a valid defense to a charge of abortion that the procurement was necessary in order to save the mother's life or the life of her unborn child; and, while this is generally true by virtue of exceptions contained in the statutes, it is true even though the statute makes no express exception as to such necessity. To this statement this court finds no exception. On the other hand, in an exhaustive examination of legislative and judicial expression of other states, this court is unable to find, except in the states of Virginia and West Virginia, precedent for the doctrine that "good faith" alone is a defense. This court is of the opinion that the Maine statute compels the conclusion that the only exception to criminal responsibility for abortion, or attempted procurement of miscarriage, is necessity in fact of the preservation of the mother's life. The burden is on the state to prove beyond a reasonable doubt that the woman was pregnant, but absolute certainty in the proof is never required. It may be established by circumstantial evidence.

Examiner Omitting Answer and Delaying Correction

(Strand v. Bankers' Life Ins. Co. (Neb.), 213 N. W. R. 349)

The Supreme Court of Nebraska, in affirming a judgment of dismissal, holds that a life insurance company that did not act on an application for two weeks, while in good faith seeking from the medical examiner an omitted answer to a material question in his medical report, was not chargeable with actionable negligence for the delay, where the applicant in his application represented the medical report "to be full, complete and true." A delay of two weeks by the medical examiner in reporting to the company a material answer omitted from his report of the medical examination was not chargeable to the company under the facts appearing in this case, where there was no delay on the examiner's part in transmitting the report itself when prepared. The company had exacted in advance a premium without assuming any obligation for insurance prior to the issuance and delivery of a policy, and there was a logical inference that the policy would have been issued and delivered except for the omission and delay mentioned. In the meantime the applicant for the insurance submitted to an appendectomy and died. This action for damages was brought by the administrator of his estate.

Requests for the omitted answer were properly directed to the examining physician. He represented both the applicant and the insurance company for purposes of the data essential to underwriting. By mere error or oversight one material answer in a long list of questions was not inserted in his original report. Negotiating parties in the ordinary affairs of life do not measure each other according to the standard of infallibility—an attribute of omnipotence. In an action against a physician for negligence in the performance of professional duties though involving human life, he is not answerable for a higher degree of skill than that ordinarily possessed by members of his profession generally. In his capacity as medical examiner of an applicant for insurance his responsibility is no greater.

By exacting in advance an agreement that there should be no contract of insurance prior to the issuance of delivery of a policy, the company guarded against the creation of a pecuniary liability before the expiration of the reasonable time required for the ascertainment of material facts in the usual course of its insurance business. While diligently seeking in good faith for two weeks the necessary information through the regular channels in the usual manner it was not liable for negligence. There was no error in requiring further time for examination and correction in this case.

An earnest argument was directed to the propositions that the examining physician was negligent in omitting an answer to the question relating to rheumatism and in failing to report the answer later when requested by letter to do so, and that this negligence was attributable to the company and prevented the delivery of a policy while the applicant was in good health. The physician was employed by the company in a limited capacity. There was no evidence of negligence in his employment. He was engaged in the general practice of medicine. The examination of an applicant for insurance was an incident of his professional duties. His practice took him away from his office. He was busy during the time in question. He did not keep clerical help. When asked for a reason for his failure to answer promptly the first letter inquiring for the omitted information, he testified: "There is no reason that I can recollect at this time except that I was busy." He said that the letter might have been misplaced and that he thought he had answered it. He was employed for the mutual convenience of the applicant and the insurer. He acted for both in conducting the examination. He did not devote all his time to the company's business. The negotiations between the applicant and the company were conducted in view of the surrounding circumstances. Necessary information was contemplated by both as a condition of incurring an insurable risk. Time for checking and correcting errors was implied by the receipt for the premium, the application and the physician's report—documents signed by the applicant himself. In the absence of fraud or deceit, mere failure to insert in the report of the medical examination an answer to a material question and delay of nearly two weeks in answering the letter of inquiry did not necessarily create in tort a liability equivalent to a contract of insurance. The applicant signed the report and had an opportunity to see that his own answers were properly reduced to writing. The company, while seeking in good faith, without unnecessary delay, the omitted information, was not chargeable with the alleged negligence imputed by the plaintiff to the examining physician. It followed that actionable negligence was not shown and that the district court did not err in directing a verdict in favor of the company.

Why Hospital Charts are Held Admissible in Evidence

(Globe Indemnity Co. v. Reinhart (Md.), 137 Atl. R. 43)

The Court of Appeals of Maryland says that in this action on an accident insurance policy the record disclosed proof of death caused by injury from a fall from a second-story window of a hospital. The hospital chart was offered in evidence to show that four hours before he fell the insured was delirious. The chart nurse testified that she made certain entries on the chart, covering the day in question, from information given to her by the nurse who was in attendance on the insured that day, and that she correctly and accurately recorded the information so given her. The attendant nurse was out of the state, inaccessible, and beyond the process of the court at the time of the trial. The court of appeals holds that it was error to exclude the hospital chart as not properly authenticated.

The question for decision was the admissibility of the chart, without having as a witness the person who had knowledge of the truth of the facts recorded in the chart. The hearsay rule generally prevents a witness from testifying to an entry unless the witness so testifying has personal knowledge of the truth of the matters recorded. There are, however, certain exceptions to this rule, based on the circumstantial guaranty of trustworthiness of the record itself, and on the inconvenience and virtual impossibility of producing witnesses who could from their own personal knowledge testify to the truth of the entries made. This court is of the opinion that the evidence represented by a hospital chart contains a sufficient guaranty of its truthfulness. It is a record required by the hospital authorities to be made by one whose duty it is correctly to make the entries therein contained. So far as the hospital is concerned, there could be no more important record than the chart which indicates the diagnosis, the condition and treatment of the patients. This record is one of the most important advantages incidental to hospital treatment, for it not only records for the use of the physician or surgeon what he himself observes during the time he is with the patient, but also records at short intervals the symptoms, condition and treatment of the patient during the whole time of the physician's absence. On this record the physician depends in large measure to indicate and guide him in the treatment of any given case. Long experience has shown that the physician is fully warranted in depending on the reliability and trustworthiness of such a record.

It is difficult to conceive why this record should not be reliable. There is no motive for the person whose duty it is

to make the entries to do other than record them correctly and accurately. On the other hand, there is the strongest reason why he should: First, because of the great responsibility, he knowing that the treatment of the patient depends largely on this record, and, if it is incorrect, it may result, and probably will result, in the patient's failure to receive proper surgical or medical treatment, which failure might be followed by serious consequences or even death. Second, the entrant must realize and appreciate that his position is dependent on the accuracy with which the record is made. Third, as has been said: "It is easier to state what is true than what is false; the process of invention implies trouble in such a case unnecessarily incurred."

What the court has said applies to a case when the person who made the entries on the chart is dead, insane or inaccessible; and it applies with equal force to the person having personal knowledge of the truth of the entries, and who, at the time when such facts were fresh in his mind, furnished them to the person who recorded them, and who is at the time of the trial inaccessible by reason of death, insanity or being beyond the jurisdiction of the court.

In this day of advancement in medical science and the diagnosis and treatment of disease, hospital staffs include many specialists in different branches of the medical profession, so that it frequently happens that a patient is examined by a number of these specialists, and it is the practice for them to dictate their observations to stenographers, who in turn convey this information to the person whose duty it is to keep the chart or record of the patient's case. If, in order to introduce the evidence contained in the chart, each of the specialists, the result of whose examinations made up the chart, were required to be present in court and testify to the truth of the particular portion of the chart made as a result of his examination, there would be a practical denial by the courts of such evidence as contained in the charts.

This court is not to be understood as holding that everything contained in the chart in question would be proper evidence, but its decision on this point is confined to determining that the objection to the admission of the chart on the ground of its contents being hearsay was not well taken. The chart being presented, if its contents on examination would be open to other objections, such as immateriality, irrelevancy or that it was an expression of opinion by persons not competent to express an opinion, those objection are not precluded by what this court has here said.

Medical Certificate Under Immigration Act Not Final

(Gee Shew Hong v. Nagle (U. S.), 18 Fed. R. (2d) 248)

The United States Circuit Court of Appeals, ninth circuit, in affirming an order denying a petition for a writ of habeas corpus, says that after the medical officers of the United States Public Health Service had certified to the commissioner of immigration that they had found the petitioner to be free from any loathsome or dangerous contagious disease and a board of special inquiry had found him to be admissible under the Chinese treaty and exclusion laws, for some reason the board referred the case back to the medical officers for a further physical examination. On such further examination the medical officers found that the petitioner was afflicted with the loathsome or dangerous disease of clonorchiasis, and certified that fact to the board, because of which the right to admission was denied. No claim was made that the petitioner was not so afflicted both at the time he first applied for admission and at the time of his second examination, but he based his right to admission on the ground that the first certificate was final and conclusive and that the second examination and certificate were unauthorized. However, this court cannot agree that the medical certificate has any such finality or conclusiveness as was claimed for it. The power to admit and exclude aliens is vested in a board of special inquiry, subject to the right of appeal, not in the medical officers of the public health service. The certificate is furnished "for the information of the immigration officers and the board of special inquiry" and is evidence and nothing more. True, an excluding certificate is not final unless based on the certificate of the medical officers; but the certificate may be challenged, at least by the alien. And if the certificate may be challenged by the alien by showing that he was not in fact afflicted with a loathsome or dangerous contagious disease, may it not likewise be challenged by the government by competent evidence, and is not a second certificate competent evidence for that purpose? Surely it cannot be successfully maintained that the immigration officers are bound to admit an alien known or believed to be inflicted with a loathsome or dangerous contagious disease, simply because a medical officer has inadvertently or inadvisedly so certified.

Counterclaim of Malpractice Not Barred in Two Years

(Fish v. Conley (N. Y.), 221 N. Y. Supp. 379)

The Supreme Court of New York, special term, Saratoga County, says that the plaintiff, by action commenced on Feb. 15, 1927, sought to recover for medical services rendered by him to the defendant between March 1, 1924, and Feb. 17, 1925. The defendant set up a counterclaim for damages for malpractice in the rendition of the medical services. The answer containing the counterclaim was served, March 29, 1927. The plaintiff moved to dismiss the counterclaim on the ground that the cause of action alleged therein was barred by the statute of limitations; but the motion is denied.

An action to recover damages for malpractice is subject to the limitation of two years prescribed in section 50 of the civil practice act. It was unquestioned that more than two years had elapsed since the accrual of the cause of action alleged in the counterclaim, and that the defendant could not have maintained an independent action therefor. The plaintiff contended that the counterclaim was therefore barred by section 61 of the civil practice act, which reads: "A cause of action other than for the recovery of real property, upon which an action cannot be maintained as prescribed in this article, cannot be effectually interposed as a defense or counterclaim." Such a construction cannot fairly be placed on the language of this section in its application to this action. The cause of action alleged in the counterclaim arose out of the original transaction on which the plaintiff based his demand for judgment. If a cause of action survived to the plaintiff from this transaction, then the defendant was entitled to assert any right or remedy that accrued to her from the same transaction. The legal effect of the transaction as to the parties, so far as they made demand in their pleadings, must be determined. The rights and remedies of the same parties arising out of the same transaction cannot be divided and separated and some preserved and others cast out. When the plaintiff commenced this action, he invited the defendant to take advantage of any infirmity that affected the transaction which was the subject of litigation, even though the defendant would be barred from instituting an independent action for the relief sought in the counterclaim. The construction urged by the plaintiff would be contrary to the plain purpose of subdivision 1 of section 266 of the civil practice act, which provides that a defendant may interpose as a counterclaim "a cause of action arising out of the contract or transaction set forth in the complaint as the foundation of the plaintiff's claim or connected with the subject of the action."

No Duty Unrequested to Furnish Treatment for Cold

(Willey v. Alaska Packers' Ass'n (U. S.), 18 Fed. R. (2d) 8)

The United States Circuit Court of Appeals, ninth circuit, in affirming a decree for the defendant, says that it appeared that in July, 1922, a seaman while engaged in the performance of his duties fell overboard, getting wet. Two weeks later he asked the superintendent in charge at Alitka, in Alaska, for medicine for a cough, and was given it; but made no further request of the superintendent for medicine, and never requested that he be given medical attention or hospital service. He died less than two years afterward from tuberculosis, and it was sought to hold the defendant liable therefor, particularly as the shipping articles and contract provided: "All parties of the second part while engaged under this contract shall receive medical and surgical attendance and medical and surgical necessities." It was contended that he should have been sent to the hospital at Larson Bay for treatment, regardless of the fact that he made no

demand for such treatment. The trouble was that neither he nor any one else believed there was any necessity for medical or hospital treatment for his cold. He told several of his fellow seamen that his cold did not amount to anything, and would be all right. The evidence showed that nearly all the men who were working in Alaska during the time he was there, including one of the defendant's physicians stationed at Larson Bay, had colds. This court is not convinced from the evidence that the disease which caused this seaman's death was brought about by, or the result of, any cold which he contracted while in Alaska.

It was true that the defendant owed him, as well as all other seamen in its employ, a duty to furnish medicines and medical attention and hospital services when necessary; but this court thinks this duty and obligation did not go to the extent which was urged on the court. It is a matter of common knowledge that all of us from time to time have colds from one cause or another, and that we do not call a physician or go to a hospital therefor. The physicians who were called as experts in the case disagreed as to whether there is any specific for an ordinary cold. Some of them contended that it must run its course, while others claimed that, if taken in time, it can be cured; that the fact remains that a common cold is rarely regarded as serious. Therefore this court is not willing to hold that it is the duty of a master of a vessel to send every seaman to a hospital who is afflicted with a cold or a cough, and whose physical appearance does not indicate that he is unable to continue to perform his duty as a seaman; and especially in cases wherein the seaman makes no representation that he is unable to work, makes no request for hospital service or for medical treatment, and whose only request is for medicine for a cold or cough. The court concludes, therefore, that the defendant was not careless or negligent in any of the respects alleged.

Contradictory Testimony of Experts for Plaintiff

(Mudano v. Philadelphia Rapid Transit Co. (Pa.), 137 Atl. R. 104)

The Supreme Court of Pennsylvania says that more than sixteen months after the plaintiff sustained a compound fracture of the os calcis or bone of the heel of his right foot through the alleged negligence of the defendant an ulcer formed on the heel, which led to serious physical conditions and harmful results. By his own testimony and that of two medical experts he attempted to show that the ulcerated condition which developed was due to the prior accident. The testimony of the two physicians must be treated as governed by the rules applicable to the evidence of the plaintiff himself, because on the particular issue as to whether all the injuries for which he was claiming damages were properly attributable, in a medical sense, to the accident, he in effect said to the jury: "I do not possess the technical knowledge to tell you that the ulcerated condition of my heel came from the accident, but these doctors will do so for me." Therefore, on that issue, he spoke through his experts, not to detail facts, but to tell the jurors what inference the established facts warranted. If, in thus speaking, his testimony was so conflicting regarding the proper inference to be drawn as to render one of two inconsistent inferences possible of adoption, the adoption of the one or the other would be nothing more than a guess, and, under such circumstances, the plaintiff would fail to sustain the burden of proof which the law cast on him. While this court has held in numerous cases that, generally speaking, where the testimony of a witness is contradictory it is for the jury to reconcile such contradictions, yet this court has also held that where a plaintiff himself is the witness and his uncorroborated testimony is so conflicting as to render it impossible to make an essential finding therefrom, it is proper for the court to instruct against the plaintiff.

Here a material fact which the plaintiff sought to prove was that the infection necessitating several operations, with the accompanyjng suffering, inconvenience and expense were all due to the accident occasioned by the defendant's negligence, and not to another, independent, cause—a blister on his heel—evidence of which he brought into the case; or, as the case developed at trial, it became necessary for him to "individuate" the real cause of his damage. This he undertook to do by expert opinion evidence. Unfortunately, the two experts whom he delegated to carry the burden of proof for him disagreed in their conclusions.

In cases in which the subject covered by opinion evidence is on the borderline between the domain of general and special knowledge, as, for example, where the value of a thing or of a service is the point at issue, the jurors, as men of affairs, may draw their own inferences from the established facts and either accept or reject the guidance of experts; but where, as here, the point before them requires special scientific knowledge for its solution, and, for that reason, the jurors are dependent on expert evidence to enable them intelligently to reach a decision, if the plaintiff, for the purpose of proving what he claims to be the efficient cause of particular results for which he is claiming damages, undertakes to speak by an expert on that issue, because it requires scientific knowledge for its elucidation, the testimony of the witness produced for that purpose must be reasonably consistent and unequivocal. If the plaintiff calls more than one expert, there must be no absolute contradiction in their essential conclusions; for, since he, carrying the burden of proof, is asking that a certain definite scientific inference shall be drawn from given facts, and is producing witnesses, accredited by him as specially qualified to draw deductions from such facts, to inform the jury, on his behalf, as to what that inference should be, it is his duty to furnish consistent, and not inconsistent, advice—otherwise the jury would be confused rather than instructed. Lacking scientific knowledge themselves, the members of the jury, when called on to determine whether a particular physical condition is the result of the accident (or of another cause, unrelated thereto), are not obliged to choose between contradictory advice tendered by the plaintiff's medical experts; the law imposes no such duty on jurors—though it may at times require them to determine whether to accept the advice of experts on one side or the other of a case.

This court does not mean, by anything said in this opinion, to intimate that, whenever a litigant calls experts and they disagree, this necessarily destroys his case on the particular point of disagreement. What the court does mean is that, when the plaintiff has the burden of proof on an issue of fact which goes to the essence of any material part of his case, and he selects scientific experts to speak for him, because the point at issue can be solved only in that way, such experts are peculiarly his mouthpiece—they take his place and may be viewed as though they collectively were the plaintiff himself. But minor points of difference between such witnesses should not be thus viewed.

Society Proceedings

COMING MEETINGS

American Association of Railway Surgeons, Chicago, November 2-4. Dr. Louis J. Mitchell, 29 East Madison Street, Chicago, Secretary.

American Hospital Association, Minneapolis, Oct. 10-14. Dr. William H. Walsh, 18 East Division Street, Chicago, Executive Secretary.

American Public Health Association, Cincinnati, Oct. 17-20. Mr. Homer N. Calver, 370 Seventh Avenue, New York, Executive Secretary.

American Society of Tropical Medicine, Boston, October 21-22. Dr. B. Schwartz, P. O. Box 131, Pennsylvania Avenue Station, Washington, D. C., Secretary.

Association of American Medical Colleges, Montreal, October 24-26. Dr. F. C. Zapffe, 25 East Washington Street, Chicago, Secretary.

Central States Pediatric Society, Cleveland, Oct. 14-15. Dr. H. T. Price, Westinghouse Building, Pittsburgh, Secretary.

Delaware State Medical Society, Farnhurst, Oct. 11-12. Dr. W. O. La Motte, Industrial Trust Building, Wilmington, Secretary.

Inter-State Post Graduate Medical Association of North America, Kansas City, Mo., October 17-21. Dr. W. B. Peck, 82 Stephenson Street, Freeport, Ill., Managing Director.

New York and New England Association of Railway Surgeons, New York, Oct. 21-22. Dr. Horace H. LeSeur, 41 Jackson Street, Batavia, N. Y., Secretary.

Ohio Valley Medical Association, Evansville, Ind., November 9-10. Dr. J. F. Wynn, 712 South 4th Street, Evansville, Ind., Secretary.

Southern Medical Association, Memphis, Tenn., November 14-17. Mr. C. P. Loranz, Empire Building, Birmingham, Ala., Secretary.

Vermont State Medical Society, Middlebury, Oct. 13-14. Dr. W. G. Ricker, 29 Main Street, St. Johnsbury, Secretary.

Virginia, Medical Society of, Petersburg, Oct. 18-20. Miss Agnes V. Edwards, 104½ West Grace St., Richmond, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in America for a period of three days. No foreign journals are available prior to 1921, nor domestic prior to 1923. Periodicals published by the American Medical Association are not available for lending, but may be supplied on order. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested).

Titles marked with an asterisk (*) are abstracted below.

American J. Roentgenol. & Rad. Therapy, New York

18: 1-102 (July) 1927

*Effect of Castration Dose of Roentgen Rays on Rabbit Ovary. M. R. Robinson, New York.—p. 1.

Bone Cavities: Roentgenologic Study. E. G. Stoloff, New York.—p. 26.

Emphysematous Blebs. W. S. Miller, Madison, Wis.—p. 42.

*Perforated Ulcer Simulating Diverticulum of Stomach. E. Freedman, Cleveland.—p. 47.

Case of Infectious Ileus or Pseudomegacolon (Hirschsprung). B. M. Bernstein, New York.—p. 52.

Mobile Ventriculographic Apparatus. H. B. McEuen, Jacksonville, Fla.—p. 70.

Combination Table for Bronchoscopic Removal of Opaque Foreign Bodies and for Reducing Fractures with Roentgenoscopic Guidance. E. P. Pendergrass, Philadelphia.—p. 73.

Effect of Roentgen Ray on Ovaries.—The clinical fear entertained by most gynecologists and obstetricians that the pregnancies following ovarian irradiation may result in offspring showing somatic or psychic defects, Robinson says, has so far not been substantiated by careful and prolonged clinical observations.

Perforated Gastric Ulcer Simulating Diverticulum.—In Freedman's case the abscess sac was situated on the posterior wall of the cardia of the stomach near the greater curvature, and its roentgenologic appearance was thought to indicate a diverticulum with malignant degeneration. The autopsy proved, however, that the diverticulum-like appearance was due to a perigastric abscess sac and the irregularities of the wall of the supposed diverticulum were due to a benign adenoma growing from a free edge of the ulcer.

American J. Surgery, New York

3: 1-98 (July) 1927

Congenital Cysts of Neck in Children. R. L. Payne, Norfolk, Va.—p. 1.

Ureteral Strictures. J. N. Baker, Montgomery, Ala.—p. 6.

After-Treatment of Fractures About Elbow. K. G. Hansson and R. G. Birrell, New York.—p. 13.

Immobilizing Cage for Treatment of Burns and Skin Grafts. A. J. Hosmer, Salt Lake City.—p. 23.

Torsion of Spermatic Cord. H. T. Wikle, New York.—p. 31.

Ligature-Carrying Tonsil Hemostat. A. J. Smith, Yonkers, N. Y.—p. 34.

Unilateral Renal Aplasia. D. W. MacKenzie and A. B. Hawthorne, Montreal.—p. 37.

Stabilization of Paralytic Feet: 213 Cases. W. C. Campbell, Memphis, Tenn.—p. 62.

American Journal of Tropical Medicine, Baltimore

7: 199-270 (July) 1927

*Classification of Bacterial Dysenteries and of Dysentery Bacilli. A. Castellani, New Orleans.—p. 199.

*Isospora Hominis in Philippine Islands. P. A. Schule, Manila, P. I.—p. 217.

Case of Oriental Sore in United States. J. M. Andrews, Baltimore.—p. 221.

Hemolytic, Cytolytic and Complement-Binding Properties of Extracts of Endameba Histolytica. C. F. Craig, Washington, D. C.—p. 225.

Sanocrysin Treatment of Leprosy. A. Paldrock and A. Rangel.—p. 241.

*Rapid Determination of Anopheles Larvae. J. Zetek, Ancon, C. Z.—p. 247.

*Malaria in Rural Areas of Southern Illinois. H. P. Carr, Springfield, Ill., and J. L. Clarke, Edenton, N. C.—p. 251.

Classification of Dysentery Bacilli.—The dysentery bacilli are grouped by Castellani as (*a*) dysentery bacilli, sensu stricto; (*b*) paradysentery bacilli and (*c*) metadysentery bacilli. The three groups have a very important characteristic in common: they do not produce gas in any sugar. A somewhat similar nomenclature may be used to indicate the various types of bacterial dysentery: (*a*) bacterial dysentery sensu stricto, due to *B. dysenteriae* Shiga-Kruse; (*b*) paradysentery, due to the different varieties of *B. paradysenteriae* Collins (var. Flexneri, var. Hissi-Russelli, etc.); (*c*) metadysentery, due to the metadysentery bacilli (bacilli of genus *Lankoides* and *Dysenteroides*).

Infestation with Isospora Hominis.—The symptoms manifested in Schule's case were intermittent diarrhea, persistent moderate distress in the epigastrium, occasional severe pains in the same area associated with the eating of fruit, attacks of nausea, weakness, and a "tired feeling." The stool material was partially formed and not unusual in any respect except for the presence of a moderate number of oocysts of a shape, size and structure corresponding exactly to those of *I. hominis*.

Rapid Determination of Anopheles Larvae.—A new "milk method" is described by Zetek for rapid identification of anopheles larvae and the distinguishing characters of the anopheles larvae of the Canal Zone are pointed out.

Malaria in Southern Illinois.—Spleen indexes taken by Carr and Clarke in southern Illinois indicate a substantial incidence of malaria in this section; the incidence of enlarged spleens is given. The distribution of the disease in the southern part of the state is shown to be not uniform but to follow certain characteristics of the physiography of the section. These characteristics are described, and on the basis of this finding the area of heaviest malaria incidence is delineated. Certain observations in regard to the interpretation of spleen data generally, and an illustration of one method of estimating the magnitude of a malaria problem in a limited area are presented.

American Review of Tuberculosis, Baltimore

16: 1-109 (July) 1927

Clinical Differences in Tuberculosis. S. L. Cummins, Cardiff, Wales.—p. 1.

*Bronchograms in Study of Pulmonary Disease. J. A. Miller and E. P. Eglee, New York.—p. 19.

*Tuberculosis of Buccal Mucous Membrane. E. H. Rubin, New York.—p. 39.

Tuberculous Stricture of Esophagus. P. P. Vinson and H. E. Dobson, Rochester, Minn.—p. 53.

*Cerebral Tuberculosis in Adults. B. M. Randolph and T. Cajigas.—p. 57.

*Origin and Dissemination of Tuberculosis. F. Neufeld, Berlin, Germany.—p. 66.

*Survey of Present Practice of Recording Body Temperature in Tuberculosis. E. H. Funk and B. Gordon, Philadelphia.—p. 78.

*Basal Metabolism in Pulmonary Tuberculosis. B. L. Brock and C. H. Haskins, Trudeau, N. Y.—p. 83.

*Primary Pleural Mesothelioma: Pneumothorax and Mediastinal Hernia: First Symptoms. F. H. Heise and F. B. Trudeau, Trudeau, N. Y.—p. 92.

*Coexistence of Syphilis and Pulmonary Tuberculosis. C. C. Habliston, Baltimore, and W. O. McLane, Jr., Frostburg, Md.—p. 100.

Bronchograms in Study of Pulmonary Disease.—Miller and Eglee believe that the use of the bronchogram is of great value in the study of certain conditions of the chest and is practically free from danger, with the reservation of a remote possibility of risk in tuberculosis. It is especially valuable in the diagnosis and study of bronchiectasis, particularly in lesions situated behind the heart and below the level of the diaphragmatic shadow. It is of real value in a certain limited number of cases of tuberculosis, and in the differentiation of cavities, open pneumothoraces and associated bronchiectasis. It is useful after thoracoplasty in giving a clearer picture of the shadows which may remain hidden in ordinary roentgenograms.

Tuberculosis of Buccal Mucous Membrane.—An analysis made by Rubin of approximately 5,000 patients with pulmonary tuberculosis, including 315 who came to autopsy, revealed oral or pharyngeal involvement in seventy-two, or 1.44 per cent. Statistical reports by other investigators give approximately a similar incidence.

Cerebral Tuberculosis in Adults.—Nine cases are reported by Randolph and Cajigas. In all these cases there was a blood leukocytosis with a high polymorphonuclear percentage. In only two of the cases was the tubercle bacillus not found in the spinal fluid. The cell count was increased in all cases, pleocytosis usually being more marked as the disease progressed. The relative percentage of polymorphonuclears varies. The lymphocytes are usually in excess, sometimes two to one, but in some cases this figure is reversed, the polymorphonuclears predominating. The globulin content was consistently high, more or less rising with the cell count.

Origin and Dissemination of Tuberculosis.—Neufeld states that if new investigations have demonstrated that the epidemiology of tuberculosis follows the same general laws as other infectious diseases, they have, on the other hand, corroborated the fact that in combating tuberculosis we must take account of the peculiarities the disease offers as an eminently chronic and, at the same time, almost universally prevalent infection. From the point of view of the bacteriologist, we may emphasize the special significance of direct pulmonary infection; the knowledge that dry dust here plays an important rôle, the special dangers of large and repeated doses of infections, and the exceptional susceptibility of early childhood. The chief influence on the course of the disease must, however, be ascribed to the constitutional factor, and to the influence exerted on this factor by food, housing and the whole mode of living.

Recording Temperature in Tuberculosis.—Funk and Gordon believe that a greater uniformity is needed in taking temperatures of tuberculous patients in place of the present somewhat haphazard practice. That more accurate information is possible is suggested by the hourly temperature curves of some of their patients, in whom the highest points were missed in the routine recording. They found that it is not uncommon for the 7 and 8 p. m. temperatures to be elevated when the 4 p. m. temperature is normal, or for the morning and evening temperatures to be normal, while the temperature is elevated during the midday hours. These observations, in connection with some studies of the temperature recorded continuously during the twenty-four hours by a resistance thermometer, form the basis of the criticism of present methods.

Basal Metabolism in Pulmonary Tuberculosis.—The basal metabolism of five tuberculous individuals was studied by Brock and Haskins and found to vary between approximately minus 19 per cent and minus 3 per cent of the average normal (Du Bois standards). A comparison between the average basal metabolisms of two tuberculous subjects studied both in winter and in summer, according to the regular routine, showed a decrease of 9 per cent and 13.2 per cent in summer as compared to winter. This is believed to be due to the long period of inactivity rather than to any environmental change.

Primary Pleural Mesothelioma.—Heise and Trudeau report the case of a man, aged 37, who developed a right-sided pneumothorax, following the lifting of a heavy weight. The lung reexpanded after three months, and three weeks later, without symptoms, collapsed again. There were no marked symptoms until three months later. Fluid formed, and there was great respiratory distress, relieved by tapping. The intervals between tapping became increasingly shorter, and the tappings gave decreasing relief until death, eight months after onset. At first a diagnosis of suspected pulmonary tuberculosis was made on account of the pneumothorax without apparent cause demonstrable by physical signs or roentgen ray. As the fluid at tappings was serosanguineous and the roentgen ray revealed developing pathologic changes in the pleura, malignant tumor of the pleura was then diagnosed. This was confirmed at autopsy. Another interesting feature of the case was a mediastinal hernia into the left lung.

Coexistence of Syphilis and Pulmonary Tuberculosis.—Habliston and McLane report the coexistence of syphilis and pulmonary tuberculosis in 14.2 per cent of patients treated in the Tuberculosis Department of the Baltimore City hospitals. Syphilis, as a latent condition, has shown little effect on the course of pulmonary tuberculosis, the results obtained being comparable with those in nonsyphilitic tuberculosis patients. Syphilis as an active disease has shown a decidedly unfavorable influence on the course of pulmonary tuberculosis, the death rate being higher than in any other class of patients treated in the hospital. Beneficial effects of treatment with arsenicals have been secured without untoward effect on the tuberculous disease. By their use in cases of pulmonary tuberculosis associated with active syphilis a decline of 14.5 per cent in the mortality and an increase of 9.8 per cent in improvement were noted.

Archives of Dermatology and Syphilology, Chicago

16: 131-258 (Aug.) 1927

*Endogenous Irritants as Factors in Eczema and in Other Dermatoses. J. F. Burgess, Montreal.—p. 131.
Progressive Pigmentary Dermatosis (Schamberg): Two Cases: Comparison with Angioma Serpinginosum and Purpura Annularis Telangiectodes. H. J. Templeton, Oakland, Calif.—p. 141.
*Effect of Gentian Violet on Organism of Blastomycotic Infection. E. S. Sanderson and D. C. Smith, Charlottesville, Va.—p. 153.
Colloid Degeneration of Skin: Case. J. H. Labadie, Ann Arbor, Mich. —p. 156.
Morvan's Disease. M. J. Morrissey and H. S. Reynolds, Hartford, Conn.—p. 166.
Tularemia: Cutaneous Manifestations: Case. E. W. Netherton, Cleveland.—p. 170.
*Experimental Transmission of Pityriasis Rosea. U. J. Wile, Ann Arbor, Mich.—p. 185.
*Treatment of Urticaria with Ephedrine. B. M. Kesten, New York.—p. 189.

Etiology of Eczema.—Some cases of eczema associated with intestinal putrefaction and the probable formation of intestinal toxins are recorded by Burgess. Of 109 consecutive cases of eczema tested for a sensitivity skin reaction to various intestinal substances, eighteen patients, or 16.6 per cent, gave positive reactions to one or more irritants. Of these, the vast majority of reactions were due to toxins produced by bacterial action on food products, while a few positive reactions were caused by amino-acids normally occurring in the intestine in the process of digestion. Of 102 noneczematous patients tested, two, or 2 per cent, showed positive reactions to intestinal toxins. Two patients with generalized pruritus gave positive reactions to intestinal irritants and amino-acids. Of four cases of urticaria tested, three patients gave positive reactions to these toxic bodies and also to basic amino-acids. This study would seem to show that eczema is essentially an allergic reaction; that, while eczema may result from "external irritant" causes, endogenous irritants which may be formed in the intestines as a result of bacterial decomposition are also capable of acting as skin irritants in the presence of an allergic disposition. It may further be noted that certain normal end-products (amino-acids) in the digestion of proteins give a definite cutaneous reaction in a small percentage of cases.

Effect of Gentian Violet on Blastomyces.—In vitro experiments made by Sanderson and Smith with a recently isolated strain of *Blastomyces* have shown that extremely dilute solutions of gentian violet possess a marked inhibitory effect on its growth.

Experimental Pityriasis Rosea.—In three cases reported by Wile, the subepidermal injection of serum obtained by blistering the primary plaque and the secondary patches of pityriasis rosea resulted in a generalized eruption which in many ways resembled the eruption in the disease as it occurs naturally. The experimental evidence of the transmissibility of the disease, although far from conclusive, at least points to an infectious agent which is present in some form in the local lesions.

Treatment of Urticaria with Ephedrine.—Six patients with chronic urticaria were treated by Kesten with ephedrine sulphate orally, with complete relief in two and improvement in two. Eleven patients with chronic urticaria and angioneurotic edema were similarly treated. Seven were cured, two were improved and two were unimproved. The dosage in these cases was: ephedrine sulphate, from 10 to 120 mg., every three hours for from one to seven weeks.

Archives of Neurology and Psychiatry, Chicago

18: 159-322 (Aug.) 1927

Suggestive Repersonalization: Psychophysiology of Hypnotism. M. Prince, Boston.—p. 159.
*Postconcussion Neurosis—Traumatic Encephalitis: Conception of Postconcussion Phenomena. M. Osnato and V. Giliberti, New York.—p. 181.
*Massive Cerebral Hemorrhage: Relataion to Preexisting Cerebral Softening. J. H. Globus and I. Strauss, New York.—p. 215.
Origin of Myelin. L. H. Cornwall, New York.—p. 240.
*Syndrome of Cerebral Origins of Visceral Nervous System: Somatic and Visceral Atrophy: Unilateral Atrophy. W. M. Kraus and O. C. Perkins, New York.—p. 249.
*Cajal and Hortega Glia Staining Methods. J. H. Globus, New York.—p. 263.

Postconcussion Neurosis.—Osnato and Giliberti assert that anatomic and clinical investigations seem to show definitely that the conception of concussion of the brain must be modified. It is no longer possible to say that "concussion is an essentially transient state which does not comprise any evidence of structural cerebral injury." Not only is there actual cerebral injury in cases of concussion but in a few instances complete resolution does not occur, and there is a strong likelihood that secondary degenerative changes develop. When this happens, the condition clinically, at least, resembles some of the reactions seen in encephalitis. The authors suggest, therefore, that the postconcussion neuroses should properly be called cases of traumatic encephalitis.

Spontaneous Massive Cerebral Hemorrhage.—Data are presented by Globus and Strauss in support of the belief that spontaneous massive cerebral hemorrhage is a terminal phase in a sequence of events which have their beginning in a generalized or somewhat localized disease of the cerebral vessels and which results in the closure of one or more of such vessels in a given, circumscribed area. This leads to the creation of an ischemic zone and a consequent focal encephalomalacia. With the production of such cerebral softening, an area of diminished resistance is created which is an important if not a determining factor in the causation of cerebral apoplexy. In the presence of a diseased blood vessel and increased vascular tension, a reduction in the consistency of the surrounding tissue of the brain is an essential precursor to the rupture of the vessel wall and the unhindered escape of blood.

Syndrome of Cerebral Origins of Visceral Nervous System.—On the evidence of one case reported, Kraus and Perkins believe that it is possible to define another syndrome of the cerebral origins of the visceral nervous system. The signs and symptoms of such syndromes may be extremely varied, but they always include one or more signs or symptoms referable to the trophic or metabolic activities of the body. The authors believe that this cerebral part of the central nervous system exerts a trophic control over muscles and bones and that the existence of this trophic control over muscles permits the description of the two recognized types of muscular wasting, atrophy and dystrophy, as somatic atrophy and visceral atrophy, respectively. The former is not related to disease of the visceral nervous system, while the latter is.

***Cajal and Hortega Glia Staining Methods.**—By utilizing frozen sections of nerve tissue as a vehicle for a chemical reaction, Globus obtained a more uniform and more complete saturation of the tissue elements with ammonium bromide. Frozen sections of desired thickness are placed in a suitable solution of ammonium hydroxide for a given length of time, and after rapid washing are acted on by hydrobromic acid. This apparently results in ample saturation of the tissue with ammonium bromide. Sections obtained from brains or spinal cords which had been kept in formaldehyde solution for months or even years, when treated in such manner and then stained by any of the methods based on the original Cajal gold chloride-sublimate principle, yielded uniform and clear histologic pictures. Another advantage in this new step is the opportunity to use sections thinner than those suggested by the authors of the original method. This insures greater clarity and uniformity of preparations than are obtained with other methods, which is an essential for detailed study and photomicrography.

Arch. of Physical Therapy, X-Ray, Radium, Omaha

8: 329-379 (July) 1927

Ultraviolet Light in Treatment of Abscessed Teeth and in Pyorrhea Alveolaris. I. L. Folstein, New York.—p. 329.
Roentgen-Ray Shadows: Their Standardization in Dental Areas. W. A. Lurie, New Orleans.—p. 335.
Status of Physical Therapy in Modern Hospital. W. H. Walsh, Chicago. —p. 343.
Relation of Sella Turcica to Endocrine Disturbances. M. Kern, Chicago. —p. 347.
Ultraviolet Radiation. E. N. Kime, Indianapolis.—p. 354.
Galvanism in Cervical Suppurations. J. U. Giesy, Salt Lake City.—p. 359.
Education in Physiotherapy. N. E. Titus, New York.—p. 362.

Archives of Surgery, Chicago

15: 155-316 (Aug.) 1927

*Postoperative Pulmonary Atelectasis. E. A. Mastics, F. A. Spittler and E. P. McNamee, Cleveland.—p. 155.
*Glossopharyngeal Neuralgia (Tic Douloureux). W. E. Dandy, Baltimore.—p. 198.
*Growth of Long Bones. Gatewood and B. P. Mullen, Chicago.—p. 215.
Paraplegia Associated with Congenital Scoliosis. K. G. McKenzie and C. L. Starr, Toronto.—p. 222.
*Fatal Pulmonary Embolism. E. F. Henderson, Rochester, Minn.—p. 231.
*Relation of Obesity to Fatal Postoperative Pulmonary Embolism. A. M. Snell, Rochester, Minn.—p. 237.
*Postoperative Phlebitis. G. E. Brown, Rochester, Minn.—p. 245.
Changes in Blood Following Operation. E. V. Allen, Rochester, Minn. —p. 254.
*Plasma Proteins in Cutaneous Burns. E. C. Davidson and C. W. Matthew, Detroit.—p. 265.
*Carotid Venous Plexus as Path of Infection in Thrombophlebitis of Cavernous Sinus: Relation to Retropharyngeal and Sphenoidal Suppuration. W. P. Eagleton, Newark, N. J.—p. 275.
Status of Enterostomy in Treatment of Acute Ileus. F. T. van Beuren, Jr., and B. C. Smith, New York.—p. 288.
Review of Urologic Surgery. A. J. Scholl, Los Angeles; E. S. Judd and others.—p. 298.

Postoperative Pulmonary Atelectasis.—Mastics and his associates emphasize the fact that pulmonary atelectasis, partial or massive, is a common postoperative pulmonary complication and presents a striking and characteristic roentgenologic and clinical picture. No doubt the majority of those postoperative conditions which have been regarded previously as either aspiration or postoperative pneumonia, bronchitis or bronchopneumonia have been cases of atelectasis. In other words, the rarity of this condition, as judged by the number of reported cases, is apparent and not real. Fifty cases are reported.

Glossopharyngeal Neuralgia.—Two cases are reported by Dandy and appended to eighteen others which have been assembled from the literature. An operation by which the ninth nerve is sectioned intracranially was carried out in both cases. It is stated that these cases are the only instances of pure, unmixed and total loss of function of the ninth cranial nerve.

Growth of Long Bones.—From the experiments performed by Gatewood and Mullen it seems evident that in rabbits no longitudinal growth occurs in the diaphyses of long bones except at the epiphyseal cartilage plates, either under normal conditions or when an increased functional demand is made by closing or hastening the closure of the epiphyses. Destruction of the extrinsic blood supply to the epiphyses by removing the adjacent periosteum and articular cartilage is not sufficient to close the epiphyses immediately, but will hasten the closure. Immediate closure of the epiphyses can be accomplished by destroying the epiphyseal cartilage plate on the side nearest the joint.

Fatal Pulmonary Embolism.—The incidence of fatal pulmonary embolism among the surgical cases that came to necropsy at the Mayo clinic during the last ten years, Henderson says, is 6 per cent. Patients at the clinic who die from pulmonary embolism are older than the average surgical patient; they are somewhat overweight, and, as a group, have a normal or somewhat subnormal blood pressure; a high percentage have postoperative infections. While the importance of the operative procedure in determining the site of thrombus formation and the occurrence of pulmonary embolism cannot be overlooked, other factors, such as age, weight, general condition of the patient, efficiency of the circulation, bodily inactivity incident to almost any operative procedure and infection, should also be emphasized.

Obesity and Fatal Postoperative Pulmonary Embolism.—Pulmonary embolism following operation seems to be a more common cause of death of the obese patient than of the average patient. Forty cases are analyzed by Snell. Whether this is due to the age of the patient, to the type of operation performed, to unknown factors related to the flow and coagulation of blood or to the obesity, per se, cannot be definitely stated. From a consideration of statistics it seems probable that there is a group of patients over 50 years of age, obese and with normal or subnormal blood pressure, who are particularly susceptible to pulmonary embolism as a postoperative complication.

Postoperative Phlebitis.—In a series of eighty-seven cases of postoperative phlebitis studied by Brown, the most characteristic diagnostic sign was a localized tenderness of the affected vein. The presence of edema is equivocal. Pulmonary infarction was a frequent complication, but no instance of fatal pulmonary embolism was encountered. Comparison of the seasonal incidence and predisposing factors in phlebitis and pulmonary embolism shows certain clear-cut differences. The degree of disability due to postoperative phlebitis was notably slight in this series of cases.

Plasma Proteins in Cutaneous Burns.—Davidson and Matthew assert that in extensive burns there is first an increased permeability of the capillaries, which explains the characteristic concentration of blood in such cases. There is no evidence to suggest that this alteration in the capillary walls persists during the period of toxemia. The late changes in the plasma proteins are probably phenomena of dilution. The plasma fibrin and globulin show a characteristic rise, and the albumin shows a fall in concentration in burns.

Cavernous Sinus Infection.—Eagleton has treated thirty-two patients suffering from cavernous sinus infection. There were six recoveries, five of which were operative and one spontaneous. Fifteen complete autopsies were made, in six of which the infection had originated from aural suppuration; and an additional patient, although the infection was of pterygomaxillary fossa origin, had a suppurative otitis prior to death.

Boston Medical and Surgical Journal

197: 119-164 (July 28) 1927

Development of Cardiovascular-Renal Disease. J. P. O'Hare, Boston. —p. 126.
*Pernicious Anemia. D. O'Hara and J. S. Grewal, Waltham, Mass.—p. 129.
Recurrent Postoperative Obstruction: Two Cases. E. F. Curry, Fall River, Mass.—p. 131.
*Cardinal Principles of Cardiac Diagnosis. W. D. Reid, Boston.—p. 132.
Case of Suprarenal Adenoma. J. Merriam, Framingham, Mass., and L. W. Smith, Boston.—p. 135.

Liver Ice Cream in Pernicious Anemia.—O'Hara and Grewal relate the case of a boy, aged 14, who had pernicious anemia. An enlarging spleen had twice been an omen of relapse, and a shrinking spleen had three times been an early sign of improvement. The usual interpretation of the enlarged spleen—that it is an index of blood destruction—was not borne out by other indications of hemolysis. In fact, with low color index, lack of jaundice, decreased platelets and polymorphonuclear leukocytes, the case seemed to suggest at all times aplasia of the marrow as the fundamental mechanism of the anemia. The authors give a formula for so-called liver ice cream: cream, 240 cc.; sugar, 15 Gm.; cocoa, 15 Gm.; a speck of salt. This is mixed as for ice cream, and then 45 Gm. of ground liver is added and the whole mixture frozen.

Cardiac Diagnosis.—"When in doubt, call it myocarditis," such, says Reid, would seem to be the reasoning used in many instances in which this diagnosis is made. As commonly used, it may fairly be termed a "waste-basket diagnosis." Reid is unacquainted with any reliable criteria on which to base myocarditis as a complete clinical diagnosis. Experience shows that this diagnosis should be made only after a careful study of the case and then there should be added, preferably in writing, "of undetermined origin." Such action will cause a sense of incompleteness and stimulate further study, as a result of which a more accurate diagnosis will often be achieved. Reid believes that the diagnosis of heart disease in patients under 40 is rarely justifiable in the absence of one or more of the chief reliable signs; in the elderly, the contrary is true.

Georgia Med. Association Journal, Atlanta

16: 223-260 (July) 1927

Periodic Examinations of Apparently Healthy Persons. E. A. Hines, Seneca, S. C.—p. 223.
History of Public Health Work in Georgia. M. E. Winchester, Atlanta. —p. 228.
Treatment of Acute Empyema of Pleura. D. C. Elkin, Atlanta.—p. 236.
Postoperative Manifestations of Syphilis in Usual Surgical Cases. T. G. Ritch, Jesup.—p. 238.
Pseudohermaphroditism: Case. W. R. Smith, Atlanta.—p. 240.
Recurrent Nuchal Ache in Chronic Malarial Cholecystostasis. G. M. Murray, Atlanta.—p. 241.
Treatment of Superficial Malignancies by Combined Methods. J. W. Landham, Atlanta.—p. 242.

Illinois Medical Journal, Oak Park

52: 89-176 (Aug.) 1927

Nasal Accessory Sinus Disease: Physical Therapy. A. R. Hollender and M. H. Cottle, Chicago.—p. 106.
Hodgkin's Disease—Abdominal Type with Primary Involvement of Retroperitoneal Glands. R. S. Boles, Philadelphia.—p. 112.
Postnatal Care. C. E. Galloway, Evanston.—p. 120.
Fundamentals in Feeding of Underweight Children. L. W. Sauer, Evanston.—p. 125.
Value of Urologic Studies in Diagnosis of Abdominal Conditions. J. S. Eisenstaedt, Chicago.—p. 127.
Gallbladder Disease. K. A. Meyer and W. A. Brams, Chicago.—p. 130.
*Selective Amputation of Index Finger. S. J. O'Brien, Munsing, Mich. —p. 133.
Two Cases of Diabetes. R. Keeton, Chicago.—p. 142.
Cosmetic Mastoid Dressing for Women. J. E. Lebensohn, Chicago.—p. 143.
*Chronic Otorrhea: Response to Calot's Solution. M. R. Guttman, Chicago.—p. 143.
*Syphilis Treatment of Tuberculosis Patients. H. L. Horwitz, Oak Forest.—p. 146.
Is Medical Legislation Necessary? J. A. Hirsch, Edwardsville.—p. 149.
Chicago Not Breeder of Crime. R. J. Finnegan, Chicago.—p. 152.
Time. M. H. Fischer, Cincinnati.—p. 157.
New Test for Diagnosis of Syphilis. F. Herb, Chicago.—p. 159.
Preventive Medicine in Nervous and Mental Diseases. P. J. Trentzsch, Culver, Ind.—p. 165.
Eye Injuries. E. C. Spitze, East St. Louis.—p. 171.

Selective Amputation of Index Finger.—O'Brien asserts that when it is necessary to amputate the index finger, at or between the second phalanx and the second metacarpal bone, the specific point of amputation should be located at the center of the middle third of the second metacarpal bone, in persons possessing an otherwise normal hand. This results in a stronger and more serviceable hand.

Treatment of Chronic Otorrhea.—Guttman relates his experience with Calot's solution in the treatment of these cases. Calot's solution is composed as follows: guaiacol, 1 Gm.; creosote, 5 Gm.; ether, 30 cc.; iodoform, 10 Gm., and olive oil, 70 cc.

Coexistence of Syphilis and Tuberculosis.—Horwitz gives data as proof that syphilis and tuberculosis do coexist. The Wassermann test in the tuberculous is as reliable as in the nontuberculous. Neoarsphenamine should be given to all patients having a definite positive Wassermann reaction with or without symptoms of syphilis. Hemoptysis is no contraindication for the use of antisyphilitic treatment.

Johns Hopkins Hospital Bulletin, Baltimore

41: 1-76 (July) 1927

*Mycotic Warts. A. P. Chavarria and P. G. Shipley, Baltimore.—p. 11.
Bactericidal Activity of Hexylresorcinol in Glycerin: Influence of Surface Tension in Chemical Disinfection. V. Leonard and W. A. Feirer, Baltimore.—p. 21.
*Heart Lesions Produced by Deep Roentgen Ray. F. W. Hartman, A. Bolliger, H. P. Doub and F. J. Smith, Detroit.—p. 36.
*Ovarian Follicular Hormone in Blood of Pregnant Woman. M. G. Smith, Baltimore.—p. 62.

Mycotic Warts.—Chavarria and Shipley took cultures from warts removed from three persons, members of one family, who became infected, one from another. The cultures yielded a fungus, a nocardia. The lesion would seem to have resulted from direct contact with an infected individual rather than indirectly through a vegetable or animal carrier of the microorganism. In all probability the disease, in the first member of this family to be infected, was acquired also by contact with a previously inoculated individual, since there is a history of a close friendship having existed between the family with which this paper deals and a man and wife who were said to have had very "sore fingers." The lesions were treated successfully with an ointment consisting of salicylic acid, 3 grains (0.2 Gm.); mild mercurous chloride, 4 grains (0.25 Gm.); wool fat, 1 ounce (30 Gm.).

Heart Lesions Produced by Deep Roentgenotherapy.—The effect of carefully measured irradiation on the heart of the experimental animal (sheep, dog) has been studied by Hartman et al., clinically and pathologically. If the dosage is

sufficient, either in a single massive or in often repeated smaller applications, certain characteristic pathologic changes are brought about in the heart. The records are presented of patients who were given relatively large amounts of deep roentgen ray over the cardiac area as a therapeutic measure for mediastinal or lung tumors, and who later came to autopsy. Microscopic sections of the myocardium from these patients show changes which are comparable to those found in the experimental animal following exposure to roentgen ray.

Ovarian Follicular Hormone in Blood of Pregnant Women.—Smith asserts that the concentration of a substance, identical in its biologic property with the ovarian follicular hormone, increases in the blood of pregnant women from the onset to the termination of pregnancy. It has always been found in the same concentration during and shortly before labor, and its concentration at this time is greater than that found at any other time. There is an immediate rapid disappearance of this substance from the blood following delivery. It can be demonstrated in the urine before and following labor. The amount found in the placenta per gram of weight is approximately twice that found in the blood per cubic centimeter. The concentration in the maternal blood during labor and in the blood from the cord is the same.

Journal of Biological Chemistry, Baltimore

74: 1-222 (July) 1927

Factors in Metabolism of Lactose: I. Disposal of Intravenously Administered Galactose in Rabbit. R. C. Corley, New Orleans.—p. 1.
Id.: II. Effect of Glucose and Galactose on Disposal of Intravenously Administered Galactose in Rabbit. R. C. Corley, New Orleans.—p. 19.
*Dietary Requirements for Reproduction: VIII. Skimmed Milk Powder Reproduction-Deficient Diet. B. Sure, Fayetteville, Ark.—p. 37.
Id.: IX. Cod Liver Oil Versus Wheat Oil as Sources of Vitamin E. B. Sure, Fayetteville, Ark.—p. 45.
*Id.: X. Vitamin B Requirements for Normal Lactation. B. Sure, Fayetteville, Ark.—p. 55.
Id.: XI. Potency of Butter in Vitamin E. B. Sure, Fayetteville, Ark.—p. 71.
*Toxicity of Zinc. V. G. Heller and A. D. Burke, Stillwater, Okla.—p. 85.
*Association of Vitamin A with Greenness in Plant Tissue: I. Vitamin Content of Head and Leaf Lettuce. M. Dye, O. C. Medlock and J. W. Crist, East Lansing, Mich.—p. 95.
Quantitative Study of Determination of Vitamin B. H. C. Sherman and E. H. MacArthur, New York.—p. 107.
Vitamin B Determination and Requirement with Special Reference to Protein Intake. H. C. Sherman and O. H. M. Gloy, New York.—p. 117.
*Formation of Lactic Acid After Severe Hemorrhage. C. Riegel, Philadelphia.—p. 123.
*Rate of Disappearance of Sodium Lactate Injected Intravenously and Its Effect on Sugar and Inorganic Phosphate of Blood. C. Riegel, Philadelphia.—p. 135.
*Determination of Carbon Dioxide in Fermenting Mixtures. A. L. Raymond and H. M. Windegarden, Pasadena, Calif.—p. 189.
Ketone Body Excretion, Dextrose to Nitrogen Ratios, and Glycogen Content of Liver and Muscles of Fasted, Depancreatized Dogs. I. L. Chaikoff, Toronto.—p. 203.
Alcoholic Content of Normal Placental Tissue. W. D. McNally, H. C. Embree and C. A. Rust, Chicago.—p. 219.

Dietary Requirements for Reproduction.—Evidence is presented by Sure showing that very small amounts of unsaponifiable matter from crude cottonseed oil (0.0175 per cent in the ration), added to a skimmed milk powder reproduction-deficient diet, prevent female sterility; also that larger amounts (0.035 per cent in the ration) of such unsaponifiable matter added to the same diet are followed by beneficial effects on lactation.

Vitamin B Requirements for Normal Lactation.—Sure found that a cold 75 per cent ethyl alcoholic extract of 6.5 Gm. of whole wheat embryo (secured from Indianapolis mills) per animal daily furnishes enough vitamin B for excellent growth. It is necessary, however, to supply the same alcoholic extract of at least 22.4 Gm. of wheat germ per lactating rat daily to furnish sufficient vitamin B for normal lactation. A cold 25 per cent ethyl alcoholic extract of approximately 13.0 Gm. of the same wheat embryo per nursing animal daily furnishes sufficient vitamin B for normal rearing and weaning of young.

Toxicity of Zinc.—Heller and Burke state that zinc added to a normal ration in the form of pure zinc dust, of zinc oxide or of certain zinc salts, in amounts as great as ever found in contaminated foods, did not interfere with growth, reproduction and normal functions of the rat through three generations. No pathologic conditions were found in the organs of rats fed the rations used in this experiment.

Association of Vitamin A with Greenness of Plants.—The evidence submitted by Dye et al. emphasizes the possibility of some connection between the presence of chlorophyl or greenness in the lettuce leaf and the vitamin A content. The outside green leaves of head lettuce were far superior to the inside yellow leaves in furnishing vitamin A. Indoor leaf lettuce proved as beneficial as outdoor leaf lettuce in producing growth.

Formation of Lactic Acid After Severe Hemorrhage.—Dogs were subjected to severe hemorrhages by Riegel and blood was analyzed at various intervals thereafter. After severe hemorrhages of 30 to 46 per cent of the total blood volume (calculated as 8 per cent of the body weight) the concentration of lactic acid in the blood is increased, the total increase and duration of the increase depending on the extent of the hemorrhage.

Fate of Injected Lactic Acid.—The conclusion is drawn by Riegel that lactic acid injected into the blood is synthesized to lactacidogen and glycogen by a process analogous to removal of lactic acid formed in muscle exercise.

Determination of Carbon Dioxide.—A method has been developed by Raymond and Winegarden for the rapid and accurate determination of the carbon dioxide formed in fermenting mixtures. The method is applicable to either aerobic or anaerobic investigations.

Journal of Chemotherapy, Baltimore

4: 43-78 (July) 1927

"Mixed Treatment" of Syphilis. S. S. Greenbaum, Philadelphia.—p. 43.
Metaphen in Treatment of Peritonitis. S. D. Spotts, Philadelphia.—p. 48.
Generalized Syphilis in Rabbit After Removal of Primary Lesion by Castration. M. Severac and G. W. Raiziss, Philadelphia.—p. 51.
Reactions Following Administrations of Arsphenamine and Its Derivatives. G. W. Raiziss and A. Koppelman, Philadelphia.—p. 55.

Journal of Infectious Diseases, Chicago

41: 1-91 (July) 1927

*New Agar-Dye Differential Medium for Colon-Typhoid Group: Use in Water Analysis. A. J. Salle, Berkeley, Calif.—p. 1.
*Relationship Between Intracellular Globulin and Toxin of Cl. Botulinum. C. I. Nelson, Chicago.—p. 9.
Acid-Fast Organism Isolated from Mouse: Mycobacterium Muris N. Sp. J. S. Simmons, Washington, D. C.—p. 13.
Synthetic Mediums in Identification of Typhoid-Paratyphoid Bacteria. L. Thompson, Rochester, Minn.—p. 16.
Precipitin, Lysin and Agglutinin Tests with Bile. E. B. Perry, Chicago.—p. 21.
*Paul Test in Diagnosis of Smallpox. J. A. Toomey and J. A. Gammel, Cleveland.—p. 29.
Production of Diphtheria Antitoxin. A. Locke, E. R. Main and F. A. Miller, Chicago.—p. 32.
Degeneration of Complement on Storage at Several Temperatures. J. F. Norton, B. Barfield and I. S. Falk, Chicago.—p. 39.
Tuberculosis in Guinea-Pigs After Treatment with Tubercle Bacilli Made Non-Acid-Fast with Oleic Acid. F. A. McJunkin, St. Louis.—p. 45.
Pharmaco-Bacteriologic Study of African Poisoned Arrows. I. C. Hall and R. W. Whitehead, Denver.—p. 51.
*Leptospira Icterohemorrhagiae. V. Langworthy and A. C. Moore, Albany, N. Y.—p. 70.

Differential Medium for Colon-Typhoid Group.—A new agar-dye differential medium for the identification of the members of the colon-aerogenes-typhoid group is described by Salle containing peptone (Difco), 5 Gm.; K_2HPO_4, 5 Gm.; KH_2PO_4, 1 Gm.; distilled water, 1,000 cc.; agar, 20 Gm.; lactose, 5 Gm.; erythrosin (2 per cent aqueous), 20 cc.; methylene blue (1 per cent aqueous), 10 cc.; bromcresol purple (1 per cent aqueous), 20 cc., and by its use two tests are incorported in one operation, thereby shortening the period of a complete water analysis by twenty-four hours. Dextrose broth cultures may be dispensed with. *B. coli* and *B. aerogenes* are sharply differentiated on this medium because of distinct differences in their carbohydrate metabolism.

Relation Between Intracellular Globulin and Clostridium Botulinum.—The results obtained by Nelson appear to warrant the conclusions that the toxin of *Clostridium botulinum* is elaborated within the cell in intimate association with the characteristic bacterial globulin; its appearance in the surrounding medium is associated with the globulin with which

it is still bound, and is accompanied by cell mortality or disintegration, so that in this sense the toxin is not in itself a true secretion; and the toxin is evidently not identical with the intracellular globulin since it can be freed of the associated globulin by peptic digestion.

Paul Test in Diagnosis of Smallpox.—In a series of eighty cases of smallpox reported by Toomey and Gammel, forty-five gave positive Paul tests. The authors feel that Paul's test, when present, may be considered pathognomonic of smallpox.

Leptospiras in Wild Rats.—Supplementary to the study of human cases of jaundice, an extensive survey was made by Langworthy and Moore to determine the presence of *Leptospira icterohemorrhagiae* in wild rats. A leptospira apparently identical with *L. icterohemorrhagiae* was demonstrated in the kidneys of more than 40 per cent, and immunologic tests of the rat serums indicated its presence in more than 60 per cent of the rats captured in Albany. The pathogenicity of the rat leptospira for human beings, which had been assumed from the identity of the leptospira strains from rats and human cases, was directly demonstrated by a case of accidental human infection with the Albany rat leptospira. A study of the immunologic reaction in this case indicated a close relationship of the rat leptospira to a strain of *L. icteroides* isolated by Noguchi from a case of yellow fever..

Medical Journal and Record, New York

41: 93-176 (Aug.) 1927

Brilliant Green in Enrichment Medium in Isolation of Typhoid and Paratyphoid Organisms. M. L. Rakieten and L. F. Rettger, New Haven, Conn.—p. 93.
Antigen for Kahn Test: Uniformity in Sensitiveness of Standard Antigen. R. L. Kahn, N. Nagle and P. L. Kendrick, Lansing, Mich. —p. 111.
Staphylococcus Bacteriophage. B. R. Calloway, New York.—p. 124.
Effects of Formaldehyde on Smooth Muscle Contraction in Anaphylaxis: Bacterial Metabolism: LXXXIV. A. I. Kendall, H. L. Alexander and J. A. Holmes, St. Louis.—p. 137.
Physiologic Action of Histamine Applied Directly to Mucosa of Isolated Surviving Intestine of Guinea-Pig: Bacterial Metabolism: LXXXV. A. I. Kendall and P. L. Varney, St. Louis.—p. 143.
Anaphylactic Contraction Induced Through Mucosa of Isolated, Surviving Intestine of Guinea-Pig: Bacterial Metabolism: LXXXVI. A. I. Kendall and P. L. Varney, St. Louis.—p. 156.
*Leptospiras from Tap Water. J. E. Walker, Washington, D. C. —p. 164.
*Potency of Stored Pertussis Vaccines. L. Mishulow, C. Oldenbusch and M. Scholl, New York.—p. 169.

Leptospiras from Tap Water.—Confirmation and extension of Hindle's experiments as applied to Washington water, together with some negative experiments relating to the pathogenicity of the organisms, is the burthen of Walker's paper. These leptospiras grew profusely in mixed culture in a medium consisting of egg yolk, 1:300, in 0.3 per cent agar. No evidence of pathogenicity was demonstrated in the organisms so cultivated. Pathogenic leptospiras in the agar-egg yolk medium survive for from ten to thirty days. There is, however, no clear evidence of multiplication, and no growth occurs in successive transfers. The latter feature, under the conditions of these experiments, forms a sharp line of demarcation between the water organisms and pure cultures of strains derived from human beings.

Potency of Stored Pertussis Vaccines.—The results of investigations made by Mishulow and others, which extended over a period of five and one-half years and in which they tested several different lots of pertussis vaccines when freshly prepared and after storing, show that there was no measurable deterioration in their power of stimulating complement-fixing antibodies in rabbits. The statement that stored pertussis vaccines lose about 75 per cent of their antigenic potency after storage for from two to three months has not been substantiated. Eight different preparations, stored at from 8 to 10 C. and tested periodically, were highly potent at the end of four and one-half years.

Medical Journal and Record, New York

126: 133-200 (Aug. 3) 1927

Rôle of Food Chlorine in Vital Processes. J. Oliver, London.—p. 133.
Biology of Skin Reactions: Tuberculosis and Syphilis. F. Herb, Chicago.—p. 135.
Dangers of Intravenous Treatment. J. H. Frick, Philadelphia.—p. 139.
Cancer: XX. Probable Colloidal Structure of Cancer Cells. W. Meyer, New York.—p. 141.
Attenuated Insanity or Dementia Praecox Epileptic Psyche. R. Alexander, Skillman, N. J.—p. 145.
Purulent Meningitis: Treatment. H. I. Goldstein, Camden, N. J.—p. 147.
Native Exercise. E. A. Rout, London.—p. 150.
Pain in Left Upper Quadrant. J. W. Shuman, Los Angeles.—p. 153.
Chest Pathology in Abdominal Disorders. J. Buckstein, New York.—p. 154.
Bromide-Chloride Treatment of Epilepsy. A. Ulrich, Zurich, Switzerland.—p. 156.
Tissue Respiration, Unexplained Since Discovery of Oxygen, as Fundamental Function of Endocrines. C. E. de M. Sajous, Philadelphia. —p. 159.
Treatment of Acute Postoperative Toxemia of Hyperthyroidism. J. Rogers, New York.—p. 166.
Therapeutic Uses of Parathyroid. L. Berman, New York.—p. 168.
Endocrine Factor in Obesity. A. Minnig, Denver.—p. 171.
Cycles of Thought in Biologic Science: IV. Teleology of Galen and of Modern Science. J. Wright, Pleasantville, N. Y.—p. 175.

Philippine Islands Med. Assoc. Journal, Manila

7: 189-234 (June) 1927

*Vital Capacity, Build and Constitution of Filipinos; Relation of These Factors to Pulmonary Tuberculosis. J. C. Nañagas, Manila.—p. 189.
Cysticercus Cellulosae in Man. C. M. Africa and J. Z. Sta. Cruz, Manila.—p. 209.
Comparative Study of Staining Method for Demonstration of Spirochetes. K. Yasuyama, Manila.—p. 215.
Advantages of Practical Teaching in Clinical Medicine. A. G. Sison and A. B. M. Sison, Manila.—p. 217.

Physical Status of Filipino and Tuberculosis.—The conditions of low body weight, poor constitution and markedly inferior vital capacity, Nañagas believes, are attributable to the actual existence of a lack or ineffectiveness of organization and stimulus to promote generalized physical exercise and outdoor sports, and absence of properly studied measures to improve the dietary of the mass, which would provide a well balanced diet for Filipinos. The factors cited, working against the entire Filipino community, explain the appalling condition of a high state of susceptibility, morbidity and mortality from pulmonary tuberculosis in the entire Philippine Islands.

Philippine Journal of Science, Manila

33: 1-125 (May) 1927

Ancylostomiasis: I. C. Manalang, Zamboanga.—p. 35.
Id.: II. C. Manalang, Zamboanga.—p. 47.

33: 127-231 (June) 1927

*Blood Chemistry Studies in Leprosy: II. Alkali Reserve. E. M. Parás, Manila.—p. 155.

Chemical Study of Blood in Leprosy.—The Van Slyke determination of carbon dioxide capacity was performed by Parás on twelve specimens of blood plasma from healthy subjects and in 110 cases of leprosy. The readings obtained for normal nonlepers range from 60 to 78 per cent by volume. Uncomplicated leprosy is not accompanied by any significant change in the alkali reserve. Determination of alkali reserve, in connection with alkali therapy, is evidently important in lepra reaction, and is valuable in the study of nephritis among lepers. No correlation can be traced between the alkali reserve and the duration, type and advancement of leprosy, or the antileprosy treatment.

Physical Therapeutics, Baltimore

45: 363-406 (Aug.) 1927

Results of Electrothermy in Epithelioma and Melanoma (Seven Cases). G. A. Wyeth, New York.—p. 363.
Sarcomatosis of Skin, Lupus Erythematosus, Duhring's Disease, Epitheliomata Treated with "Grenz Rays." G. Bucky, New York.—p. 371.
Tinea Sycosis, Tinea of Scalp, Lupoid Type of Sycosis Barbae, Alopecia Totalis. M. A. Lyons, New York.—p. 375.
Bone Tumor of Radius: Roentgen-Ray Treatment. L. T. Le Wald, New York.—p. 376.
Granular Trachoma: Ultraviolet Radiations (Water Cooled Lamp). C. F. Stokes, New York.—p. 380.
Effect of Heat Lamp in Obstinate Constipation: Value to Relax Abdomen for Physical Examination. A. Bassler, New York.—p. 381.
Prolonged Intensive Diathermy for Gonococcal Infection. V. C. Pedersen, New York.—p. 382.
Scar Contracture of Flexor Sublimis Digitorum. R. Kovacs, New York. —p. 383.
Frontal Sinusitis with Chronic Tonsillitis Treated by High Frequency Currents. C. R. Brooke, Newark, N. J.—p. 385.

Public Health Journal, Toronto

18: 301-350 (July) 1927

Community Milk Supplies in Ontario. D. V. Currey.—p. 301.
Junior Red Cross and Public Health. E. G. Benedict.—p. 322.
Prevention of Diphtheria. B. C. Gruenberg.—p. 337.

Southwestern Medicine, Phoenix, Ariz.

11: 299-342 (July) 1927

Orris Coryza. E. W. Phillips, Phoenix.—p. 299.
Surgical and Postural Treatment of Diffuse Peritonitis. C. A. Thomas, Tucson, Ariz.—p. 303.
Persistent or Patent Thymic Duct. M. C. Comer, Tucson, Ariz.—p. 308.
Myiasis in Southwest, with Particular Reference to Species Chrysomyia Macellaria. R. J. Stroud, Tempe, Ariz.—p. 313.
Blood Transfusion. F. J. Milloy, Phoenix.—p. 317.
Granuloma Fungoides. A. A. Shelley, Phoenix.—p. 319.
Foreign Bodies in Air and Food Passages. H. T. Bailey, Phoenix.—p. 323.
Uses of Ultraviolet Rays in Certain Eye, Ear, Nose and Throat Diseases. H. Yandell, Phoenix.—p. 325.
Errors of Refraction in Children. E. L. Christensen, Phoenix.—p. 326.
Asthma of Nasal Origin. F. L. Reese, Phoenix.—p. 328.
Tuberculous Meningitis: Case. J. W. Laws, El Paso.—p. 330.

Texas State Journal of Medicine, Fort Worth

23: 177-248 (July) 1927

Surgical Aspects of Certain Brain Lesions. E. R. Carpenter, Dallas.—p. 189.
Head Injuries. J. F. Ford, Dallas.—p. 192.
Surgery of Urinary Bladder. A. O. Singleton, Galveston.—p. 195.
*Facts About Texas Snakes and Their Poison. M. L. Crimmins, San Antonio.—p. 198.
*First Aid Treatment for Snake Bite. D. Jackson, San Antonio.—p. 203.
Pollen Hay-Fever and Asthma in Children. I. S. Kahn, San Antonio.—p. 209.
Enlarged Thymus: Cases. L. D. Hill, San Antonio.—p. 213.
Research and Progress in Radiology. D. Richardson, Austin.—p. 216.
Unborn Babe. C. R. Hannah, Dallas.—p. 220.
Art of Medicine. H. C. Haden, Houston.—p. 224.

Prevention of Snake Bite.—Crimmins urges that greater care than is now employed should be taken to guard against snake bite. Snake dens should be destroyed by explosives in the hibernation season, as poisonous gases for this purpose have been found unsatisfactory. All poisonous snakes should be killed wherever seen. Rattlesnakes will usually stay coiled. The use of hogs, in thick brush, to kill snakes is a practical measure, when possible. Premises about homes and schools should be cleared and fine wire netting should be strung about the lower part of raised buildings to keep snakes out. No one should be allowed to go without shoes in a snake infested country, and overalls or leggins should be worn when working in the field. A "first aid snake kit" should be kept handy in the home and in the automobile. This first aid kit should contain a suction pump described in this article. A rubber tourniquet should be employed but should not be left on too long a period of time. The use of antivenin serum is recommended.

Treatment of Snake Bite.—A method of treatment in cases of rattlesnake bite is described by Jackson. A tourniquet should be applied to increase the venous congestion and assist in washing out the poison. A cross cut incision one-fourth by one-fourth inch should be made over each fang mark, or preferably to connect the two fang punctures. Suction should be applied for at least half an hour. If this is done within an hour from the time a person is bitten, very little additional treatment is necessary; however, if the swelling has increased up the arm or leg, procaine hydrochloride should be injected, completely encircling the limb above the proximal edge of the swelling. A double line of small cross cuts, about one-eighth inch deep and across, should be made. They should be about one inch apart, and encircle the limb. Suction should then be used for half an hour. If there is a pocket or some area more swollen than another, a nest of punctures should be made over this area and suction applied. A large quantity of bloody serum containing venom can be withdrawn. New punctures should be made every few hours and suction repeated for half an hour. This treatment should be continued for the first eight or ten hours after the patient has reached the hospital. If the swelling does not decrease, the entire process should be repeated.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British J. Children's Diseases, London

24: 83-164 (April-June) 1927

*Prevention of Rheumatic Heart Disease in Children. J. F. H. Dally.—p. 83.
*Dick Test. J. C. J. McEntee.—p. 91.
*Hemiplegia Associated with Extensive Nevus and Mental Defect. T. Brushfield and W. Wyatt.—p. 98.
*Transfusion Treatment of Chronic Enterocolitis of Infancy. G. H. Wood and R. Aidin.—p. 107.
Case of So-Called Winckel's Disease (Cyanosis Afebrilis Icterica cum Hemoglobinuria). W. M. Feldman.—p. 113.
*Foreign Body in Tonsil Simulating Diphtheria. E. C. Willcox.—p. 118.

Prevention of Rheumatic Heart Disease in Children.—By timely advice to parents, together with the institution of appropriate therapy to raise the vis resistentiae of the three chief tissues vulnerable to attack, namely, the muscles—including the heart—the skin and the mucous membranes of the child against adverse climatic and other influences, Dally believes that weakly children of rheumatic stock may themselves be aided to work out their own immunity.

Dick Test Alone Not Guide to Diagnosis.—Because it is not reliable, McEntee says, the Dick test, though helpful, is not alone a guide to diagnosis. The skin reaction is not proportional to the amount of toxin injected. This may indicate the widely different degrees of natural immunity or the extreme sensitivity of the test. A different and more accurate means of standardizing scarlatinal toxin must be devised. Further investigation is imperative to determine the varieties of toxic products of true scarlatinal streptococci, to solve the aberrant forms of scarlet fever, and to explain the apparently anomalous results of the Dick test.

Hemiplegia Associated with Mental Defect.—Among 2,412 mentally defective children, Brushfield and Wyatt found three cases in which an unusual but characteristic syndrome has been present. The most striking and constant features of these cases were: (*a*) mental defect, (*b*) extensive nevus, (*c*) hemiplegia. The mental defect was in each case of marked degree, the children being low-grade imbeciles who were unable to talk or walk, and who were quite helpless as regards their bodily needs. The condition was in each case present from birth, and the children all showed various stigmas of degeneration. A striking feature of these cases was the extensive involvement of the skin by nevus. These markings were much more pronounced over the face and neck, but no part of the body was entirely free, the total area of the nevus covering approximately one third of the skin surface. In two cases there was left hemiplegia, and in one case right hemiplegia. There were the usual features of infantile hemiplegia with contractures, wasting and underdevelopment.

Transfusion in Chronic Enterocolitis in Children.—Transfusion of twelve infants who had enterocolitis with unmodified blood through the internal saphenous vein was done by Wood and Aidin. Ten showed temporary improvement, but only two ultimately recovered. It was fairly common for the stools to be normal in color and smooth in consistency for twenty-four or forty-eight hours after a transfusion, although they had been mucoid green and lumpy for weeks before.

Brooch in Bronchus.—From the tonsil of an 8 weeks old infant, Willcox removed a pin bringing with it a gold brooch, which, depending from its pin, had been hanging down in the upper opening of the esophagus and closely over the posterior extremity of the laryngeal orifice.

British Journal of Radiology, London

32: 239-274 (July) 1927

Action of Radon "Seeds" on Tumor and Liver Cells of Rat. S. Russ and G. M. Scott.—p. 239.
Fibrocystic Disease of Lungs. P. Kerley.—p. 245.
*Calcified Fibroma of Hand. J. H. Mather.—p. 251.

Calcified Fibroma of Hand.—Mather's patient presented a sessile tumor the size of a small orange on the palm, at the bases of the index and middle fingers. It was uniformly hard

and not attached to bone, or to skin except at the summit, where it was discharging superficially. The roentgen ray showed the tumor to consist mainly of irregular masses of calcareous material. It was probably in the nature of a fibroma undergoing calcareous degeneration. At operation the tumor was found to be attached to the deep palmar fascia.

British Medical Journal, London

2: 123-152 (July 23) 1927

Strategic Front of Medicine Today. R. Philip.—p. 123.
Present Hospital System. E. W. Hey Groves.—p. 131.
*Virulence of Pneumococci in Pneumonia. C. H. Whittle.—p. 134.
Dermatitis Exfoliativa. W. L. Tullis.—p. 135.
Acute Appendicitis Complicating Tuberculous Ascites. H. F. Blacklee.—p. 135.

Virulence of Pneumococci in Pneumonia.—Whittle divides pneumococci into two groups by virtue of their pathogenic power, those of high virulence setting up well recognized clinical entities such as lobar pneumonia and bronchopneumonia, and those of low virulence which are associated with minor illnesses or disease occurring in persons already debilitated. The organisms of the first group are probably spread by contact, much as cerebrospinal meningitis is spread, with only a small percentage of "contacts" contracting the disease. The second group causes illness only under exceptional circumstances, and their effect is less specific and less typical. They are more akin in their behavior to such relatively harmless organisms as *Streptococcus salivarius*, which they closely resemble.

2: 153-196 (July 30) 1927

*Fractures of First Cervical Vertebra. G. Jefferson.—p. 153.
*Anastomosis of Recurrent Laryngeal to Phrenic Nerves. E. B. Barnes and C. Ballance.—p. 158.
*Experimental Prevention of Stone in Bladder in Rats. R. McCarrison.—p. 159.
*Bactericidal Action of Light on Tubercle Bacilli. A. Eidinow.—p. 160.
Tubal Abortion and Rupture. R. Butterworth.—p. 161.
Shrapnel Fragment in Tonsil. F. Guiver.—p. 162.
Laryngeal Spasm Associated with Peritonsillar Abscess. D. Glass.—p. 162.
*Blood Transfusion in Hemorrhagic Disease of New-Born. I. Cainer.—p. 162.

Fractures of Atlas.—Jefferson analyzes sixty-five cases of uncomplicated and complicated fractures of the atlas, two of these being reported for the first time.

Anastomosis of Recurrent Laryngeal to Phrenic Nerve.—Barnes and Ballance report a case of complete traumatic division of both recurrent laryngeal nerves which was treated by anastomosis of each nerve to the phrenic nerve of the same side. Some recovery of function was observed.

Prevention of Bladder Calculus.—McCarrison states that the addition of whole milk, in the proportion of two-thirds ounce per rat daily, to a diet capable of causing urolithiasis in 50 per cent of young rats completely prevented the development of phosphatic calculi.

Bactericidal Action of Light on Tubercle Bacillus.—Eidinow's experiments afford evidence that rays shorter than 3,300 angstrom units are the most bactericidal on the tubercle bacillus. The long ultraviolet rays from 4,000 to 3,300 angstrom units were without effect.

Spontaneous Recovery from Melena Neonatorum.—Cainer reports a case of spontaneous recovery from what he diagnosed melena neonatorum of three days' duration. The only treatment given was 1 minim (0.06 cc.) of tincture of ferric chloride every hour.

Journal of Anatomy, London

61: 387-527 (July) 1927

Hydrocephalus in Infant. R. J. Gladstone and H. A. Dunlop.—p. 387.
Comparative Anatomy of Lateral Geniculate Body. H. H. Woollard and J. Beattie.—p. 414.
Developing Third Nerve Nucleus in Human Embryos. I. C. Mann.—p. 424.
Problem of Innervation of Dentine. D. Stewart.—p. 439.
*Interscapular Gland and Tumors Arising Therein. K. Inglis.—p. 452.
*Cerebral Hemispheres of Brain of Gorilla. W. E. L. Clark.—p. 467.
Ear of Carolan Last of Irish Bards. M. A. MacConaill.—p. 476.

Tumors of Interscapular Gland.—Two cases of tumors arising in the so-called interscapular gland are described by Inglis. The first of these tumors, a congenital cystic tumor of the neck, consisted of three types of cysts, one containing clear fluid, one containing blood and one containing yellow semifluid material. This tumor is regarded as a hemangiolymphangioma with secondary changes in the enmeshed glandular adipose tissue. The lesion is a congenital malformation, but the malformation is not static. It appears to be progressive, the vessels continuing to "malform." The second tumor involved the glandular adipose tissue, not the lymph and hemolymph nodes. It is considered to be an example of "lipoma glandulare."

Brain of Gorilla.—A description is given by Clark of the cerebral hemispheres of a gorilla which had been kept under observation in captivity for a period of some years prior to death. Attention is especially drawn to the relative complexity of the parietal lobes in contrast with the frontal and occipital lobes; the remarkable extent to which the insula is concealed by surrounding opercula, so that the insula on the right side is completely buried from the surface, thus reproducing the condition to be found in the human brain, and asymmetry of the brain and venous sinuses, which corresponds to the typical asymmetry of the human brain.

Journal of Tropical Medicine and Hygiene, London

30: 181-192 (July 15) 1927

*Malaria and Tuberculosis. M. Freiman.—p. 181.
*Identification and Differentiation of Fehling-Reducing Sugars in Urine by Castellani-Taylor Mycologic Method. P. Pietra.—p. 182.

Malaria and Tuberculosis.—Freiman records the observation that, in districts where malaria is endemic, patients clinically free from signs of tuberculosis, often after having contracted malaria, suddenly showed an acute tuberculous development. On the other hand, the consumptives with malarial infection gave exacerbations sometimes with a fatal termination.

Castellani-Taylor Mycologic Method for Differentiating Sugars.—Pietra found that the Castellani-Taylor mycologic method is useful in the differentiation of the various Fehling-reducing sugars which may be present in urine, viz., glucose. It is essential to use selected strains of the various organisms with permanent biochemical characters and producing a large amount of gas.

Lancet, London

1: 1115-1168 (May 28) 1927

Teaching of Industrial Medicine. T. Legge.—p. 1115.
*"Ether" Convulsions. S. R. Wilson.—p. 1117.
*Cholecystography. P. G. McEvedy and J. E. Sheret.—p. 1119.
*Acute Infective Osteomyelitis. B. Hughes.—p. 1121.
*Attempt to Isolate Bacterium Pneumosintes from Patients Suffering from Influenza. G. S. Wilson.—p. 1123.
*Etiology of Influenza. D. Thomson and R. Thomson.—p. 1125.
Preparation and Properties of Female Sexual Hormone (Menformon) in Water-Soluble Form. E. Laqueur, P. C. Hart and S. E. de Jongh.—p. 1126.
Exogenic Dermatitis. W. J. O'Donovan.—p. 1128.
Acute Anaphylaxis. L. S. Dudgeon.—p. 1130.
Spleen and Immunity. W. Susman.—p. 1130.

Ether Convulsions.—The convulsions referred to by Wilson represent an entirely new complication of ether anesthesia. They are toxic in origin and due to the presence of impurities in the ether. The question of ether purity requires further investigation, and strict standard tests are required for application to all ethers supplied for the purpose of general anesthesia.

Cholecystography.—McEvedy and Sheret report that cholecystography after the oral administration of sodium tetraiodophenolphthalein gave a correct diagnosis in 92 per cent of cases controlled by operation.

Acute Infective Osteomyelitis.—Of forty cases of symptomatic type reported on by Hughes, there have been four deaths, a mortality of 10 per cent. Twenty-five cases occurred in males and fifteen in females, or the disease in this series is nearly twice as common in the male sex. Of the bones infected, the femur was involved in sixteen, and all four deaths were associated with infection of this bone, two involving the upper diaphysis and the hip-joint, and two the lower diaphysis, one involving the knee-joint. Of the remaining twenty-four cases, five involved the proximal site of the

diaphysis of the tibia, and ten were confined to the distal site. Thus, thirty-one out of forty cases involved the bones of the lower extremity; i. e., 75 per cent. The remaining nine cases involved the humerus in five, the radius in two and the ribs in two.

Studies of Bacterium Pneumosintes.—The nasopharyngeal washings of seven patients within the first twenty-four hours of a typical attack of influenza have been examined by Wilson by the method of Olitsky and Gates. From not a single patient did they succeed in isolating *B. pneumosintes*. The serum of sixteen persons who had recently suffered from influenza was tested against a *B. pneumosintes* antigen, along with the serum of nineteen control persons. No agglutination was observed—even in a dilution of 1:2. Though Wilson has carefully followed the technic of Olitsky and Gates, he has completely failed to confirm their observations on the presence of *B. pneumosintes* in the nasopharynx of patients in the early stages of influenza.

Etiology of Influenza.—The Thomsons describe a pleomorphic streptococcus which they have found in the blood of influenza patients.

2: 157-212 (July 23) 1927

Strategic Front of Medicine Today. R. Philip.—p. 157.
Obstetrics and Gynecology. J. S. Fairbairn.—p. 163.
Jaundice in Relation to Surgery. E. R. Flint.—p. 165.
*Mortality from Hematemesis. E. Bulmer.—p. 168.
Prevention of Pyorrhea. F. D. Donovan.—p. 171.
*Self-Induced "Reduction en Masse." P. Hawe.—p. 172.
Intestinal Concretions. A. Woodmansey.—p. 172.
Transposition of Viscera. M. E. M. Jago.—p. 173.

Mortality from Hematemesis.—An analysis of 526 cases of severe hematemesis is presented with postmortem reports on fifty-three of the sixty-seven fatal cases. The mortality from acute gastric ulcer was 8.3 per cent; in the males it was 16 per cent; in the females, 8.7 per cent. The mortality in the chronic ulcers was 11.6 per cent; in the males it was 16.8 per cent; in the females, 8.7 per cent. The mortality from bleeding ulcers has risen during the last eight years, and some of the causes for this are discussed, with a plea for moderation in the use of morphine. The cases of hematemesis, other than those resulting from acute and chronic ulcers, are tabulated by Bulmer. These consisted of cases of hepatic cirrhosis, carcinoma of the stomach, melena neonatorum, portal thrombosis, etc.

Self-Induced Reduction en Masse.—Hawe reports the case of a man who reduced his inguinal hernia and several days later presented symptoms of acute intestinal obstruction. Operation revealed a "reduction en masse"; the whole sac had been displaced from the inguinal canal into a properitoneal position and the neck of the sac was strangulating 3 inches of the small intestine contained therein. The patient died from paralytic ileus two days later.

Royal Soc. of Trop. Med. & Hygiene Trans., London

21: 1-79 (July 11) 1927

Organization of Medical Research in Tropics. A. T. Stanton and Others.—p. 19.
Signs and Symptoms in Late Syphilis in Buganda. W. L. Webb and M. Holliday.—p. 39.
Dysentery in Palestine. I. J. Klinger and I. Weitzman.—p. 49.
*Agglutination Test in Undulant Fever Due to Brucella Abortus: Value of "Abortoscope." G. R. Ross.—p. 57.
*Production of Malaria Antigen for Complement-Deviation Test. P. Manson-Bahr.—p. 63.
Elephantiasis Mammae: Case. J. H. Pasqual.—p. 69.

Agglutination Test in Undulant Fever.—Experimental evidence is submitted by Ross that both *Brucella melitensis* and *Brucella abortus* can be employed as the test suspension in the diagnostic agglutination test for undulant fever due to *Brucella abortus*. Attention is drawn to the "abortoscope" as a promising method of performing the agglutination test in a simple, rapid and reliable manner.

Malaria Antigen for Complement Deviation Test.—Manson-Bahr's experiments in this direction resulted in failure as the result, he belives, of the unsatisfactory nature of the antigen employed, an alcoholic extract of the oocysts of the malaria parasite in the stomachs of infected anopheles mosquitoes.

National Medical Journal of China, Shanghai

13: 151-227 (April) 1927

Influence of Varying Conditions on Content of Uterus. C. Pak.—p. 151.
*Novarsurol as Diuretic. J. T. Jai.—p. 158.
*Cyanide Poisoning from Bitter Apricot Kernels. B. E. Read and C. T. Feng.—p. 170.
Surgical Side of General Medical Practice. S. F. Li.—p. 177.
*Differential Diagnosis of Early Pulmonary Tuberculosis and Mitral Disease. M. Chien.—p. 184.
*Active Principle of Opium When Smoked. S. Nakajima and S. Kubota.—p. 194.

Merbaphen as Diuretic.—Jai found merbaphen (novarsurol) to be a powerful diuretic, but its action rarely lasts more than twenty-four or at most forty-eight hours. In ascites, cardiac edema and nephritis with good renal function, good results were obtained. However, merbaphen should be given only in small doses at first; and daily urine examinations are needed to detect early toxic symptoms, and prevent any cumulative action of mercury.

Cyanide Poisoning from Bitter Apricot Kernels.—Bitter apricot kernels, the source of essential oil of almonds, are a common cause of poisoning in China. They are identical in action with bitter almonds. Various food delicacies made from bitter apricot kernels are described by Read and Feng, and analyses given to show the presence of traces of hydrocyanic acid, useful as flavoring agent, and not in large enough amount to be of danger as a poison.

Diagnosis of Early Pulmonary Tuberculosis.—Among 153 cases of tuberculosis seen by Chien, there occurred thirteen instances of mitral disease. Cases are presented to show the similarity of symptoms of early mitral disease and incipient pulmonary tuberculosis.

Active Principle of Opium When Smoked.—On investigation Nakajima and Kubota found that about 15 per cent of the alkaloids of smoked opium goes into the smoke and is not burned in the pipe. They are destroyed. This is the reason why it is difficult to find morphine in smoke and why the opinions of investigators have not agreed.

Oriental Journal of Diseases of Infants, Kyoto

2: 125-142 (April) 1927

Artificial Feeding of Infants: I. Nutritive Value of Dried Milk. T. Suzuki.—p. 125.
*Types of Dysentery Bacilli and Prognosis of Dysentery in Dairen Children. T. Yoshitomi.—p. 133.
Dysentery in Children; House Epidemics. N. Hoshi.—p. 134.
*Rapidity of Blood Sedimentation in Syphilitic Nurslings. H. Minamide.—p. 136.
*Blood and Spinal Fluid Findings in Hereditary Syphilis. T. Iizuka.—p. 137.
*Thymus Aberrata in Wall of Ileum. K. Suzue.—p. 138.
Effect of Dysentery Toxin on Surviving Segment of Intestine of Rabbit. K. Suzaki.—p. 139.

Types of Dysentery Bacilli in Children.—Yoshitomi typed the bacilli in fifty-seven cases of dysentery. The Y type was isolated from twenty-six cases, the Flexner type from nineteen cases and the Shiga type from five cases. The Shiga bacillus cases were of the longest duration, thirty-three days, and also gave the highest mortality, 23 per cent. In the remaining cases, the mortality was only 8 per cent.

Blood Sedimentation in Syphilitic Nurslings.—Minamide asserts that the rapidity of blood sedimentation in syphilitic nurslings is very great, from 3.8 to 5.4 cm. He regards this as an important aid in diagnosis.

Blood and Spinal Fluid in Hereditary Syphilis.—In 63 per cent of fifty-two cases of hereditary syphilis, Iizuka found a considerable reduction in the number of erythrocytes and a relative change in 85 per cent, in which there was also a reduction in the number. The hemoglobin percentage was lowered absolutely in 73 per cent and lowered relatively in 94 per cent.

Aberrant Thymus in Ileum.—During the necropsy on an infant, aged 5 months, Suzue found a thymus aberrata in the wall of the ileum 40 cm. above the valvula coli: The hypoplasy of the thymus dexter proved that the thymus aberrata was a deposit from it, a germ of it having immigrated into the ileum early in fetal life.

Bulletin de l'Académie de Médecine, Paris

97: 787-804 (June 14) 1927

*Possible Rôle of Transitory Parasitism in Etiology of Digestive Tract Cancers. F. Arloing and A. Josserand.—p. 791.
Methyl Salicylate Glucosides. M. Bridel.—p. 795.
Botelho's Reaction in Cancer. R. Douris and J. Beck.—p. 797.
Results of Heliotherapy. P. F. Armand-Delille.—p. 801.

Possible Rôle of Transitory Parasitism in Etiology of Cancers of Digestive Tract.—In seven of thirty-six white rats ingesting fecal material from cancerous human digestive tracts, neoplasms developed. A pyloric adenoma, on section, was shown to have developed at a point where a *Cysticercus fasciolaris* had been encysted in the peritoneum; a small nematode was found in a mediastinal mass, and a papilloma of the cardia presented a parasite analogous to Fibiger's spiroptera. If it is to be supposed that the parasites, accidentally in transit in man, were simply revealed by the organism of the mouse, then it must be admitted that these parasites are more frequent in the digestive tracts of cancerous than of noncancerous patients.

97: 837-854 (June 28) 1927

Recurrent Prostatic Hypertrophy. P. Bazy.—p. 843.
Tolerance and Absorption of Bismuth Salts. Laurent-Gérard and OEchslin.—p. 845.
*Antitoxic Rhinovaccination. C. Zoeller and G. Ramon.—p. 849.

Rhinovaccination, Especially Antidiphtheritic. — It was ascertained by Zoeller and Ramon that the introduction of diphtheritic or tetanus anatoxin per os is absolutely ineffectual, whether or not it be preceded by the ingestion of bile. On the other hand, anatoxin introduced by the nasal route provokes the development of a specific immunity. The authors used an anatoxin concentrated by evaporation, to which pure sterilized glycerin was added. This technic localizes the action of the anatoxin to the nasal and rhinopharyngeal mucosa, to which it adheres. Instillations or powder insufflations of the pure anatoxin were also employed. In this case, a part of the antigen is absorbed, either by inhalation or after deglutition, and hence the absorption zone is less clearly circumscribed. The immunity obtained through rhinovaccination is general and analogous in all characteristics to immunity obtained by the subcutaneous route. The authors also investigated the action of Dick toxin and of dysenteric toxin. Rhinovaccination may be used to advantage in subjects hypersensitive to diphtheritic anatoxin and in delicate infants.

Presse Médicale, Paris

35: 849-864 (July 6) 1927

Cancer in History of Medicine. G. Roussy.—p. 849.
*Experimental Research on Vasomotor Innervation. R. Leriche and R. Fontaine.—p. 852.
Methodical Examination of Physiognomy. P. Desfosses.—p. 859.

Vasomotor Innervation: Vascular Reflexes of Limbs.—Vasomotor paralysis from disease or operation is either extremely rare or does not exist at all. Taking lack of response of the vessels of the region in which the nerves have been resected as evidence of paralysis of the vasomotors, Leriche and Fontaine were unable to find any instances among fourteen cases of recent and old nerve sections. All the patients reacted normally. Vessels deprived of nerves usually termed vasomotor are not paralyzed. The reflex which is responsible for the circulatory modifications in relation to external temperature goes beyond the cord and beyond the great sympathetic centers, since the reactions continue to be produced after an ablation or section of the nerve trunks, even when this is so old that degeneration has had time to take place. The fact that the bath and oil of mustard tests bring into play different reflex arcs, leads to the deduction that the vasomotor reactions may originate from different reflex routes. Motor innervation of the vessels is assured, above all, by intramural, peripheral centers. Hot and cold baths provoke modification of the local circulatory system of the immersed limb and reflex variations of the general blood pressure, which alone are bilateral. The postoperative circulatory variations in the side operated upon differ from those observed in the intact side, in that they are due only to modifications of the peripheral blood irrigation.

35: 865-880 (July 9) 1927

*Oil Injections. L. Binet and H. Binet.—p. 865.
*Iodine in Treatment of Splenomegalies. A. Nanta.—p. 867.
Late Paralyses of Cubitalis Following Fractures of External Condyle of Humerus. L. Desgouttes and R. Denis.—p. 868.
Growth and Alimentation in Children. R. Clément.—p. 869.

Oil Injections.—Oil injected under the skin does not pass at once into the blood or lymph circulation. It is attacked on the spot by the mononuclears, which seem to be differentiated in the connective tissue. It there undergoes saponification, sets free fatty acids and does not entirely disappear until after two, three, four or more months. The substances combined with the oil (e. g., iodine) have their own coefficient of absorption.

Iodine in Treatment of Splenomegalies.—In the treatment of splenomegalies, whether malarial, mycotic or syphilitic, tincture of iodine, from 10 to 50 or even 100 drops, may be given daily by mouth in several doses; or potassium iodide in solution, from 2 to 4 Gm. per day. By the subcutaneous route one may inject fairly large doses of iodine, in combination with potassium iodide and glycerin, or as iodized oil. The most active treatment is the intravenous injection of Gram's solution or compound solution of iodine.

Archivos de Medicina, Cirugía y Espec., Madrid

27: 141-168 (Aug. 6) 1927

*Amylosuria in Pancreatic Disease. L. Urrutia.—p. 141.
Water Metabolism and Equilibrium. V. Calvo Criado.—p. 145.
Idiopathic Pulmonary Edema. P. Carrasco Martinez.—p. 149.
Injuries to Motor System of Eye. Mallol de la Riva.—p. 152.

Amylosuria in Pancreatic Disease.—Urrutia applied Wohlgemuth's test in fifty-four cases to verify its diagnostic value. In thirty-five cases the figures fell within normal limits, from 8 to 64 units. In nineteen cases they were 128 or over. A clinical and laboratory study showed that figures under 64 units may be accepted as being suggestive of a normal pancreas, with a probable error of 12 per cent, while figures above 128 units point to a pancreatic lesion with a 5 per cent chance of error. Hydatid cysts of the liver presented uniformly low figures, with one exception. This case was complicated with a callous gastric ulcer close to the pancreas. Out of twenty-nine gastroduodenal ulcer cases, the amylosuria test yielded normal figures in eighteen without pancreatic involvement. Of the eleven cases with pancreatic involvement, the figures were high in nine and normal in two.

Semana Médica, Buenos Aires

34: 1-60 (July 7) 1927

*Intraperitoneal Urinary Discharge in Infant. E. Foster et al.—p. 1.
Mitral Asystole. T. Martini and M. Joselevich.—p. 11.
Chronic Duodenal Enlargement. J. A. Saralegui et al.—p. 15.
Intestinal Intussusception from Polyp. A. C. Cucullu and M. J. Vergnolle.—p. 20.
Gummatous Osteomyelitis. G. Allende.—p. 25.
Spindle Cell Osteosarcoma. C. A. Castro.—p. 28.
Fibroma and Pregnancy. A. Guitarte and M. Isaac.—p. 54.

Ureteral Tear with Fatal Intraperitoneal Discharge of Urine in an Infant.—An infant, aged fourteen days, was admitted to the hospital with an increasing abdominal swelling, ascites and anuria of three days' duration. An abdominal puncture drew urine. The necropsy disclosed an atrophied right kidney, an enlarged left kidney, kinks in both ureters, and occlusion of the right one. The left ureter had ruptured.

Arch. f. exper. Pathol. u. Pharmakol., Leipzig

123: 259-385 (July) 1927

Action of Morphine on White Mice. P. Pulewka.—p. 259.
*Action of Hops on Frogs. A. Stavén-Grönberg.—p. 272.
Ethyl Iodide Method of Estimating Heart Beat Volume. W. Mobitz and K. Hinsberg.—p. 282.
Toxin of Pernicious Anemia. D. I. Macht.—p. 290.
*Pharmacology of Renal Vessels. M. Ozaki.—p. 305.
*Action of Epinephrine on Cerebral Vessels. M. Miwa et al.—p. 331.
*Cleavage Products of Proteins and Tuberculous Guinea-Pigs. G. Lepehne and R. Wigand.—p. 348.
Standardization of Glycerol Preparations of Digitalis. O. Ehrismann.—p. 384.

Action of Hops in Frogs.—Stavén-Grönberg's experiments on frogs indicate that hops and their extracts—especially lupulin—have a narcotic action.

Pharmacology of Renal Vessels.—An apparatus for perfusion of organs under constant pressure is described by Ozaki. Using it he observed constantly a considerable dilatation of the renal blood vessels under the influence of caffeine derivatives. This dilatation is of peripheral origin. Pituitary extracts have primarily a constrictor action, although a simultaneous increase in blood pressure may dilate the vessels. Epinephrine and digitalis preparations always have a constrictor action.

Action of Epinephrine on Cerebral Vessels.—Miwa, Ozaki and Shiroshita observed constriction of the cerebral arteries under the influence of epinephrine only when the blood pressure was kept constant. Otherwise, the cerebral blood circulation increased.

Cleavage Products of Proteins and Tuberculous Guinea-Pigs.—The action of the products of peptic and tryptic digestion of fibrin and of colon and typhoid bacilli was investigated by Lepehne and Wigand. Typhoid bacilli digested by trypsin proved to be the most toxic of all. There was practically no difference between the reaction of healthy and tuberculous guinea-pigs. This indicates that tuberculin does not act as a simple cleavage product, since its action is much more pronounced in tuberculous animals.

Beitr. z. klin. Chirurgie, Berlin

139: 383-568, 1927

*Langhans' Proliferating Goiter. E. Bircher.—p. 383.
Technic of Bone Suture. A. Driels and H. Fromm.—p. 421.
Tetanus in Rhineland in Peace Time. H. Bodewig.—p. 430.
Importance of Psychic Element in Surgery. E. Melchior.—p. 445.
Late Results of Latent Congenital Coxa Valga Luxans. W. Müller. —p. 464.
Pyelogram in Destructive Processes in Kidney. A. Schmidt.—p. 484.
Improved Technic for Stereoroentgenography with Bucky-Potter Diaphragm. J. Sommer.—p. 504.
Larvated Recurrent Cholecystitis Without Stone. V. Hoffmann.—p. 507.
Avoidance of Eventration Injuries in Abdominal Operations in Childhood. R. Sievers and T. Schornstein.—p. 517.
*Nonimportance of Adhesions in Diagnosis of Chronic Appendicitis. R. J. Harrenstein.—p. 533.
Postoperative Roentgen-Ray Irradiation in Carcinoma of Breast. K. Luhmann.—p. 544.
Homeoplastic Skin Transplantation and Vital Staining. H. Tammann and M. Patrikalakis.—p. 550.

Langhans' Proliferating Goiter.—In the past twelve years, Bircher has seen thirty-six cases of Langhans' proliferating goiter (adenocarcinoma, according to Eiselsberg and Erdheim). He did not find it to be malignant clinically, but it has certain characteristics that separate it from the main goiter group. It has a strong predilection for childhood, and it is refractory to iodine. Insufficiency of the pulmonary circulation, with weakening of the power of the heart from dyspnea caused by compression of the trachea, was frequent. Both hyperthyroid and hypothyroid phenomena were seen. The tendency to recur is strong and is manifested early.

Adhesions in Diagnosis of Chronic Appendicitis.—Harrenstein holds that the finding of appendicular adhesions at operation is without evidential value as to chronic appendicitis or as to an earlier attack of acute appendicitis.

Deutsche med. Wochenschrift, Berlin

53: 1247-1290 (July 22) 1927

Functional Pathology. G. von Bergmann.—p. 1247. C'td.
Neuroses. A. Goldscheider.—p. 1250. C'tn.
Irradiated Egg-Yolk. F. Rohr and O. Schultz.—p. 1255.
Healing of Wounds. M. Kappis.—p. 1257.
*Cooking and Food Value of Eggs. A. Scheunert and E. Wagner. —p. 1258.
Cerebral Hemorrhage. E. Siemerling.—p. 1260.
*Extract from Spirochetes and Immune Serum. F. Klopstock.—p. 1261.
Testing of Arsphenamine and Digitalis. E. Rost.—p. 1262.
Preparation Resembling Epinephrine. O. Ehrismann.—p. 1263.
Pernicious Anemia. W. Schmidt.—p. 1264.
Treatment of Constipation. R. Pinner.—p. 1265.
Meinicke Turbidity Test. G. Elkeles.—p. 1265.
Therapy of Vegetative Nervous System. F. Glaser.—p. 1267.
Vaccination and Local Reaction. F. Hoppe.—p. 1268.

Cooking and Food Value of Eggs.—Scheunert and Wagner fed young rats with raw, soft boiled and hard boiled eggs. The rats did not thrive on raw eggs, but developed well when the eggs were boiled. The authors deny the existence of a "budget value" of food, in Friedberger's sense.

Extract of Spirochetes and Immune Serum.—Klopstock returns to Wassermann's original opinion as to the specificity of the Wassermann reaction. Injection of killed cultures of *Spirochaeta pallida* induces an abundant production of "lipoid" antibodies.

Deutsche Zeitschrift für Chirurgie, Leipzig

202: 217-288 (May) 1927

Consequences of Infection Following Autoplasty of Hip. Von Stubenrauch.—p. 217.
Hormonal Stimulation of Growth of Mammary Gland. M. Ernst. —p. 231.
"Chemical Inflammation" in White Mice. E. Glass and E. Krüger. —p. 241.
Massive Hemorrhages into Renal Region and Apoplexy of Suprarenals. T. Brunner.—p. 248.
Injuries from Spinal Anesthesia with Procaine Hydrochloride and Epinephrine. M. Franke.—p. 262.
*Nerve Division and Cancer. N. N. Ssokolow.—p. 270.
Fistula Auriculae Congenita. F. Breuer.—p. 278.
Traumatic Aneurysm of External Iliac Artery. E. Sattler.—p. 283.

Influence of Nerve Division on Carcinoma.—In twenty-two cases of squamous cell carcinoma (mostly of the skin) Ssokolow performed Molotkoff's division of the sensory nerves supplying the region. In two cases the operation was followed by disappearance of the cancer; in the others there was either no change or the rate of growth and the malignancy increased. The cures, one of which is of two years' standing, were, perhaps, in Ssokolow's opinion, spontaneous cures. Molotkoff's theory of the neuritic origin of cancer was not confirmed.

202: 289-426 (June) 1927

General Anesthesia with Intravenous Injection of Barbituric Acid. R. Bumm.—p. 289.
Judging Reserve Strength of Heart. Offergeld.—p. 304.
Ileus. P. Muzenick.—p. 325.
*Pancreatic Involvement in Icterus and Cholelithiasis. R. Janker.—p. 360.
Concealed Bullet in Atlas. I. G. Knoflach.—p. 366.
Resection of Lower Jaw. H. Gross.—p. 374.
Malignant Primary Subungual Melanoblastoma. K. Specht.—p. 390.
Hematomas of Skin Following Strumectomy. F. Driak.—p. 400.
New Bladder Irrigator. A. Narath.—p. 402.
Tumor of Semilunar Cartilage. B. Kott.—p. 406.

Diagnosis of Pancreatic Involvement in Catarrhal Icterus and in Cholelithiasis.—Diastase values in blood and urine very much above normal, Janker states, point to involvement of the pancreas. The more or less complete absence of diastase in the stool indicates the degree of functional insufficiency of the gland.

Klinische Wochenschrift, Berlin

6: 1409-1456 (July 23) 1927

Disturbances of Speech. M. Nadoleczny.—p. 1409.
*Pathology of Bronchial Asthma. W. Dehner.—p. 1412.
"Synthalin" Treatment of Diabetes. O. Thill.—p. 1417.
Diabetes with Hypertension. F. Peiser.—p. 1419.
Tubal Insufflation. E. E. Pribram.—p. 1423.
*Uric Acid Metabolism and Insulin. L. Kürti and G. Györgyi.—p. 1426.
*Subdeltoid Bursa. H. Virchow.—p. 1428.
Osteosynthesis. O. Lauer.—p. 1429.
Inconstancy of Blood Picture. Arneth.—p. 1431.
*Reversal of Permeability of Erythrocytes. R. Mond.—p. 1432.
*Nature of Allergens. F. Klewitz and R. Wigand.—p. 1432.
Poisoning with Eserine. A. Gernhardt.—p. 1433.
Pyodermias; Treatment. M. Jessner.—p. 1434. C'td.
Abortion and Sterilization. W. Lustig.—p. 1437.

Pathology of Bronchial Asthma.—Dehner publishes the necropsy reports of two cases of bronchial asthma. Suffocation by mucus was the probable cause of death. He believes that treatment with large doses of morphine contributed to the event by lowering the irritability of the respiratory center.

Uric Acid Metabolism and Insulin.—Kürti and Györgyi observed delayed elimination of uric acid during insulin treatment.

Subdeltoid Bursa.—In necropsies, Virchow frequently found inflammation of the bursa located beneath the deltoid muscle. The bursa communicated with the shoulder joint in some of these cases. The so-called subacromial bursa is only a pocket of the subdeltoid.

Reversal of Permeability of Erythrocytes.—In an alkaline medium (p_H 8 to p_H 8.3) erythrocytes become permeable for cations and impermeable for anions. Since the iso-electric

point of globin is at p_H 8.1, he believes that the surface membrane of the erythrocytes contains it.

Nature of Allergens.—Klewitz and Wigand found that hayfever allergens resist heating, may be dialyzed and do not give the biuret reaction. Nitrogen is absent from some of them.

6: 1457-1500 (July 30) 1927

Normal Sleep in Man. C. Rosenthal.—p. 1457.
Rationalizing Nutrition. O. Kestner.—p. 1461.
Basis of Action of Roentgen Rays in Inflammatory Diseases. F. Freund. —p. 1462.
*Determination of Lactic Acid of Blood, Especially in Liver Diseases. G. Noah.—p. 1465.
Research on Iso-Agglutinins. O. Thomsen.—p. 1466.
Infraclavicular Infiltrations. Unverricht.—p. 1468.
Suprarenal Lipase. M. N. Tschetschoksarow and S. J. Malkin.—p. 1472.
Accident Neuroses. W. Kaldewey.—p. 1475.
Blood Pressure Regulation in Hypertonic Patients. E. Baráth.—p. 1476.
Welfare Work for Convalescent Children. M. Klotz and G. Storck.—p. 1478.
Hypersensitiveness to Rubber. Grimm.—p. 1479.
Glycogen Research. E. Burghard and H. Paffrath.—p. 1479.
Action of Hydrated Imidazols on Blood Sugar. F. Haurowitz and M. Reiss.—p. 1479.
Pyodermias; Treatment. M. Jessner.—p. 1480. C'en.
New Apparatus for Intestinal Sound Diagnosis. A. Simeons.—p. 1498.

Determination of Lactic Acid of Blood, Especially in Diseases of Liver.—The lactic acid content of the blood in normal rabbits fluctuates moderately (from 12.5 to 20 mg. per cent). After doses of galactose as well as after small doses of phosphorus given over a long period, it does not deviate from the normal. After injections of lethal amounts of phosphorus, the blood lactic acid is occasionally elevated. Human beings suffering from diseases of the liver show, in a fasting state, a normal lactic acid content. In two cases of liver atrophy (subchronic and acute) an abnormally high lactic acid content was found in the last days or hours of life, a fact which must be taken into consideration in diagnosis and differential diagnosis. If the patient suffering from hepatic disease be given glucose or galactose, increase of the lactic acid content of the blood, in respect to the fasting value, is produced in only a few cases. In a case of large supraclavicular and infraclavicular malignant tumor it could be demonstrated that the blood coming from the tumor had a considerably higher lactic acid content than blood from other parts of the body, while the sugar content was diminished, compared with the blood sugar value at other times. Only in extensive destruction of the liver is the carbohydrate assimilating function of the liver disturbed in such a way that there is an abnormal accumulation of lactic acid in the blood. In all other hepatic diseases this lactic acid stasis is not to be expected; after larger doses of carbohydrate, only sporadic lactic acid increases appeared.

Medizinische Klinik, Berlin

23: 1089-1128 (July 22) 1927

Physiology and Toxicosis of Pregnancy. L. Seitz.—p. 1089. C'td.
Typhoid in Hanover. E. Friedberger.—p. 1091.
Treatment with Artificial Light. F. Peemöller and F. Dannmeyer.—p. 1097.
Schlatter's Disease. C. M. Behrend.—p. 1101.
*Permanent Anesthesia in Eye Diseases. W. Alexander.—p. 1103.
Pathology of Trichinosis. H. Nevinny.—p. 1105.
Infraclavicular Tuberculous Infiltration. K. Dietl.—p. 1106.
Vasoconstriction Neurosis of Nipple. D. Steinthal.—p. 1106.
Registration of Venous Pulse. Von Socha-Borzestowski.—p. 1106.
Cold and Appendicitis Not Due to Injury. W. Brandis.—p. 1112.
Renal Function Tests. F. Lebermann.—p. 1113.

Permanent Anesthesia in Eye Diseases.—Alexander advises injection of alcohol into the gasserian ganglion in incurable painful diseases of the eye.

23: 1129-1168 (July 29) 1927

*Value of Tuberculin Treatment. W. Neumann.—p. 1129.
Operative Treatment of Constipation; Hirschprung's Disease. F. Brüning. —p. 1133.
Hypoglycemic Reaction, Especially "Insulin Psychoses." A. Oppenheimer.—p. 1138.
Malignant Chorionepithelioma. W. Pahl.—p. 1141.
Delivery with Perineovaginal Incisions; Value in Face Presentation. E. Solms and B. Stern.—p. 1143.
Treatment of Chronic Recurrent Arthritis with Sulphonated Bitumen per Os. G. Bitta.—p. 1145.
Roentgenologic Signs in Gastritis. K. Gutzeit.—p. 1145.
Value of Fibrinogen Determination. E. Klimesch and O. Weltmann.—p. 1146.
Obstetric and Gynecologic Therapy, Including Drugs. G. Burckhard.—p. 1149.
Globuli Vaginales. O. Laufer.—p. 1150.
Malignant Tumor as Sequel of Accident. W. Brandis.—p. 1153.
Physiology of Skin. F. Pinkus.—p. 1154.
Renal Function Tests. F. Lebermann.—p. 1155.
Progress in Roentgen-Ray Diagnosis. F. Munk et al. Supplement.—pp. 113-139.

Value of Tuberculin Treatment.—Of three patients with tuberculosis, with cavities, treated by tuberculin, one appeared to be permanently cured. The second gained 16 Kg. in weight, but there was a recurrence. The third patient was a young girl in whom, after tuberculin treatment, the cavities entirely disappeared. So typical are the effects of tuberculin on the temperature and on the amount of urine, that one can make use of the absence of such effects as a direct indication against the diagnosis of tuberculosis. The favorable results from the use of tuberculin, seen in idiopathic pleural effusions, as well as in effusions after operative measures, may also be observed in many cases of polyserositis. Tuberculin treatment is efficacious in tuberculous arthritis and in the different kinds of uveitis, scleritis and choroiditis.

Monatsschrift für Geb. und Gynäkologie, Berlin

76: 241-396 (June) 1927

*Inflammation of Adnexa in Pregnancy. E. Heyer.—p. 243.
Torsion of Umbilical Cord. F. Heimann.—p. 255.
Abdominal Pregnancy with Living Child. E. Beaucamp.—p. 260.
Lacerations of Cervix in Spontaneous Births. W. Rosenstein.—p. 265.
Case of Fistula Cervico-Vaginalis Laqueatica. H. Schröder.—p. 274.
Pressure Necroses of Intra-Uterine Origin. B. Liegner.—p. 278.
Sarcoma of Ovary and Peritoneal Tuberculosis. K. Atzerodt.—p. 282.
Schubert's Vaginoplasty. K. Hille.—p. 288.
Artificial Vagina from Small Intestine. V. Lebedeff.—p. 294.
Duty of Physician as Regards Giving Testimony. Bähr.—p. 296.

Inflammation of Adnexa During Pregnancy.—Inflammatory disease of the adnexa is rarely seen in pregnancy. Unilateral disease before conception or infection at the time of conception are probable when adnexal inflammation is encountered in pregnant women. Heyer described a case in a woman who had borne seven healthy children. The expanding uterus loosened the adhesions by which nature was limiting the infection and peritonitis resulted. Uterus and adnexa were removed and the woman recovered.

Münchener medizinische Wochenschrift, Munich

74: 1171-1212 (July 15) 1927

Pendulous Breast. E. Glaesmer and R. Amersbach.—p. 1171.
Basal Metabolism. E. R. Grawitz.—p. 1176.
*Body Length and Weight. R. Geigel.—p. 1178.
*Psoriasis and Blood Group. A. Poehlmann.—p. 1180.
Cultivation of Tubercle Bacilli. T. Sütterlin.—p. 1180.
Unconscious Inhibition of the Will to Work. E. Beyer.—p. 1181.
Influenza Bacillus Sepsis. A. Lechner and A. Boetzel.—p. 1182.
How a Paratyphoid Epidemic Was Prevented. K. Kisskalt.—p. 1183.
A Physician's Thoughts on Medicine. A. Bier.—p. 1186.
Dressings. A. Krecke.—p. 1188.
The Public Health Physician and Racial Hygiene. H. Krauss.—p. 1190 C'td.

Body Length and Weight.—Geigel found a surprising lack of regularity in the relation between the length and weight of his subjects. For instance, with all the lengths between 158 and 176 cm. the probable weight was always between 50 and 70 Kg.

Psoriasis and Blood Group.—In 100 psoriasis patients, Poehlmann found blood group O in 54 per cent, A in 28 per cent, B in 13 per cent, AB in 5 per cent as against 41.5; 42.3; 10.18, and 6.0 per cent, respectively, among the general population of Munich.

74: 1213-1262 (July 22) 1927

Four Hundred Years of Medicine in Marburg. G. Denecke.—p. 1213.
Striated Muscles During Chill. E. F. Müller and W. F. Petersen.—p. 1218.
Treatment of Abortion. R. Bund.—p. 1220.
*Magnesium Phosphate and Muscles. L. Wacker.—p. 1222.
Training Camp for Apprentices. K. Gebhardt.—p. 1223.
Acidotic Vomiting in Children. H. Seckel.—p. 1227.
Roentgen-Ray Dosage in Dermatology. Schulte.—p. 1228.
New Roentgen-Ray Apparatus. Gutzeit.—p. 1228.
*Improved Perineal Suture. A. L. Scherbak.—p. 1230.
Epidemiology of Venereal Diseases. A. Buschke and M. Gumpert.—p. 1231.

History of Medical Teaching in Marburg. F. Sorge.—p. 1231.
Blood Transfusion in Gynecology. L. Seitz.—p. 1232.
Medical Direction of Athletics. Worringen.—p. 1233.
Public Health Officer and Racial Hygiene. H. Krauss.—p. 1235. C'en.

Magnesium Phosphate and Muscles.—Wacker discusses the significance of magnesium in the muscle. It is present chiefly in the form of insoluble magnesium phosphate, which may dissolve when the muscle becomes more acid—either from fatigue or in postmortem rigidity. The paralyzing action of magnesium ions may have a regulating effect in fatigue.

Improved Suture of Perineum.—Scherbak hooks a metal "finger" into the rectum and hangs a 1 pound weight on it. After this it is easy to suture the torn parts accurately.

Wiener klinische Wochenschrift, Vienna

40: 961-988 (July 28) 1927

Indications for Artificial Pneumothorax and Its Results. L. Petschacher.—p. 961.
Abnormal Credulity and Morbid Mendacity. M. Weissmann.—p. 965.
*Fatal Subacute Thallium Poisoning. L. Kaps.—p. 967.
*Peculiar Picture of Sepsis in Aortic Stenosis at Isthmus. W. Embacher.—p. 970.
*Tissue-Fluid Reaction of Organism in Diseases of Stomach. I. Gavrila.—p. 973.
*Intestinal Action of Quinine. M. Harnik.—p. 974.
Importance of Erroneous Diagnosis in Roentgen-Ray Treatment of Supposed Myoma. P. Werner.—p. 979.
Functional Testing of Eye. E. Bachstez.—p. 980.

Criminal Fatal Subacute Thallium Poisoning.—The case reported by Kaps shows that the symptoms appear in from three to five successive stages; first there is a short period of severe gastro-intestinal disturbances—vomiting, nausea, colic, diarrhea, which soon changes to stubborn constipation and anorexia. Then there are disorders in the central and vegetative nervous systems—trophic disturbances, conjunctivitis, blepharitis, alopecia totalis, acute suppurative dermatitis of the face. In this second stage, there were also, in his case, symptoms of a preponderatingly sensory and sensitive nature—acroparesthesias, decreased tactile sense with extraordinarily increased contact sensitiveness, painfulness of the musculature and joints. There were retrobulbar neuritis, terminating in complete amaurosis, and decline of the psychic functions up to complete dementia. In the third stage, there is degeneration of the heart, liver and kidneys. The method of action of subcutaneous thallium poisoning must be sought in an injury of the central and vegetative nervous systems with secondary disturbance of the nervous regulation of the endocrine gland apparatus.

Peculiar Picture of Sepsis in Aortic Stenosis at Isthmus.—The clinical diagnosis in Embacher's case was septicemia. At autopsy the typical picture of aortic isthmus stenosis was found. The patient crushed two of his fingers and the nail of one had to be removed. From this time on, there was fever. Urinalysis showed albumin. In the meantime, coughing and rusty sputum led to the diagnosis of influenza. After the patient was in the hospital, he had severe attacks of nosebleed and punctate petechiae appeared on both legs. The cutaneous hemorrhages increased in number, but were limited to the lower half of the body, from the umbilicus down. Because of the rarity of clot formation in the descending aorta, an isthmus stenosis should be suspected in such cases.

Tissue-Fluid Reaction of Organism in Lesions of Stomach.—Patients with gastric ulcer show a normal p_H of the blood and normal alkali reserve. The resistance of the urine to alkalinization is almost the same as in normal persons. In cases of mild stenosis, a manifest alkalosis is observed.

Intestinal Action of Quinine.—Quinine produces intestinal as well as uterine contractions, which, in their turn, strengthen the pains of childbirth. The fetus also reacts by the passage of meconium, to the quinine given the parturient woman. That quinine administered to the mother so seldom results in the passage of a stool is due to the fact that the intestine has been emptied by irrigation. In some cases a stool would be mechanically impossible because of pressure. Whether the quinine is entirely harmless to the fetus, Harnik thinks, is undecided. The fetus is, at any rate, quite sensitive to quinine.

Zeitschrift für Tuberkulose, Leipzig

48: 273-352 (July) 1927

*Sensibility of Pleura, Pericardium and Peritoneal Covering of Diaphragm; Nervus Phrenicus. E. Simenauer.—p. 273.
*Cadmium Treatment of Pulmonary Tuberculosis (Walbum's Method). N. Lunde.—p. 285.
*Basis of Lowered Metabolism Treatment of Pulmonary Tuberculosis. G. Jacubson.—p. 299.
*Cinnamic Acid Treatment of Pulmonary Tuberculosis. T. Sternberg.—p. 309.
Pulmonary Tuberculosis: Artificial Pneumothorax Treatment in Home. M. J. Fine.—p. 312.
*Technic of Artificial Pneumothorax. F. Loben.—p. 314.
New Drugs and Remedies in Treatment of Tuberculosis. G. Schröder.—p. 316.

Sensibility of Pleura, Pericardium and Peritoneal Covering of Diaphragm.—The sensibility of the pleura costalis and the other serosae was tested by Simenauer for contact, pressure, pricking and temperature. Slight friction was in most cases not felt, moderate pressure and pricking were named as such, and in the majority of cases the friction was felt most intensely in the course of the intercostal nerves. Temperature sensibility did not appear. The pleura visceralis showed itself nonsensitive. All tests of the pleura diaphragmatica, except the temperature test, brought forth shoulder pain, if the irritation was in the central part; in the investigation of the peripheral portion pain or sensitiveness appeared at certain intensities, according to the region. The pericardium was reached three times. From the heart apex a feeling of pressure was transferred to the inner side of the left arm; contact and moderate pressure on the pericardium of the right ventricle were not felt, heavier pressure was localized as unpleasant on the fourth rib, somewhat inward. In a pericardium showing inflammatory changes, the irritation remained without effect. The author claims this to be the first examination of its kind of the pleura diaphragmatica and of the pericardium. The conception that the shoulder pain depends on the radiation of the irritation along the afferent phrenicus path to the nervi supraclaviculares seems correct. Original relations and anastomoses of the nervus phrenicus, as well as data of developmental history, support this view. It disproves the theory that the sympathetic fibers in the phrenic nerve conduct sensibility; the phrenic nerve is, rather, a mixed motor and sensory nerve like all other spinal cord nerves. As to the pericardium, relationships are not yet explained.

Treatment of Pulmonary Tuberculosis with Metallic Salts According to Walbum.—From the literature and from his own experiments, Lunde concludes that cadmium is an active, energetic remedy, as effective, in its way, as is tuberculin.

Basis of Treatment of Pulmonary Tuberculosis by Means of Lowered Metabolism.—Jacubson reviews metabolism in other diseases. In pulmonary tuberculosis, in which a large part of the purine is oxidized not only to uric acid but still further, the question is not of an elevation of the uric acid level, nor of uric acid deposit and concretion. Instead, there is a lowering of the blood uric acid level (a prognostic indication in more severe pulmonary tuberculosis). These facts may, therefore, be referred to increased metabolism (that is, increased oxidation on account of increased acid content of the tissues).

Old and New Cinnamic Acid Treatment of Pulmonary Tuberculosis.—Sternberg finds that Landerer's data on the curative value of cinnamic acid may be explained as nonspecific irritation-body action of the parenterally administered preparation. Through oral administration a sudden disturbance of the balance of the organism is avoided; on the other hand, protracted administration produces a benzoylization of the blood and tissue, which soon finds expression in a general drop in temperature and in a local diminution of the secretions; an influence on the focus seems, in the opinion of Landerer, not excluded.

Technic of Artificial Pneumothorax.—Loben recommends that pneumothorax should be carried out under local anesthesia of the pleura with procaine hydrochloride. The introduction of the anesthetizing fluid into the pleural cavity is to be avoided. The needle should be introduced after the cutis and subcutis have been incised with a small scalpel.

Zentralbl. f. Chirurgie, Leipzig

54: 1537-1600 (June 18) 1927

Suture of Wounds of Crucial Ligament. A. Wittek.—p. 1538.
Results of Hallus Valgus Operations. H. Brauneck.—p. 1542.
Operation for Gastroptosis. R. Göbell.—p. 1546.
Von Petz's Gastro-Intestinal Suture Apparatus. J. Loessal.—p. 1547.
*Productive Ossifying Periostitis of Tuber Calcanei. W. R. Braizew.—p. 1550.
Removal of Anesthetic Gases After Expiration. F. Hölscher.—p. 1558.
Charcoal in Prevention of After-Effects of Anesthetics. F. Hölscher.—p. 1559.
Improvement in Intravenous Infusion. H. Lampert.—p. 1561.
Salivary Fistulas: Reply. K. Saposchkoff.—p. 1563.
Bifurcation of Upper End of Femur in Congenital Dislocation of Hip. H. von Baeyer.—p. 1565.
Phlegmon of Large Intestine Complicating Appendicitis. Z. Pataky.—p. 1566.

Productive Ossifying Periostitis of Tuber Calcanei.—Three cases in young persons with a history of arthritis are described, with roentgenograms. The disease attacks by preference the posterior process. It may be complicated by inflammation of the bursa achillea. To avoid recurrence, treatment must consist of extensive deep removal of bone as well as of periosteum, bursa mucosa and spur, if such exists.

54: 1601-1664 (June 25) 1927

*Surgical Treatment of Calcaneal Spur. M. Brandes.—p. 1602.
*Tendon Suture. E. Moser.—p. 1606.
Tenodesis by Transosseous Fixation of Tendon. F. Momburg.—p. 1608.
Fibroma of Stomach. B. Milonov.—p. 1609.
Accessory Pancreas in Stomach; Brunner's Adenoma. H. Hilarowicz.—p. 1610.
Modification of Wolff's Extension Clamp. A. Gruca.—p. 1615.
Myxedema Mistaken for Abdominal Tumor. G. Büttner.—p. 1616.
Secondary Hemorrhage After Use of Joseph's Clamp. H. G. Zwerg.—p. 1618.
Hydrocele of Spermatic Cord. C. Prima.—p. 1619.

Surgical Treatment of Calcaneal Spur.—When recourse to surgery is necessary in these cases, Brandes insists on radical operation with adequate exposure.

Local Anesthetic and Tendon Suture.—Moser has found local anesthesia, by injection into the muscle, a decided advantage in tendon suture. It makes a second incision unnecessary. The muscle swells in the longitudinal as well as in the transverse direction and muscle relaxation continues for a considerable time, so that early pulling on the suture is avoided.

Zentralbl. f. Gynäkologie, Leipzig

51: 1481-1560 (June 11) 1927

*Endometrium in Fallopian Tube. R. Meyer.—p. 1482.
*Diagnosis of Rupture of Membranes. V. Gold.—p. 1491.
Congenital Secondary Glaucoma. C. Wigger.—p. 1493.
Cancer Hair. S. Simon.—p. 1496.
Oxyuris Eggs in Band of Omentum. G. Bodechtel.—p. 1500.
Repeated Extra-Uterine Pregnancy on Same Side. E. Bierendempfel-Pleick.—p. 1502.
Malignant Degeneration of Implantations in Abdominal Walls After Extirpation of Papillary Tumors of Ovary. R. Tauber.—p. 1505.

Endometrium in Tube.—In Meyer's opinion, it is unnecessary to assume implantation from the uterus to account for endometrium in the place of tubal mucous membrane. Heteroplasia on the basis of congenital predisposition and dependent on ovarian activity or other stimulating influences is a sufficient explanation. He has seen functioning endometrium in the place of tubal mucous membrane only once. Heterotopic proliferations of the tubal mucosa on an inflammatory basis may easily be demonstrated.

Diagnosis of Rupture of Membranes.—The reaction of the vaginal secretion is a reliable criterion, Gold states, as to whether or not the membranes have ruptured. The presence of amniotic fluid turns the otherwise acid secretion alkaline. An admixture of blood, disinfecting fluid or urine must, of course, be ruled out.

51: 1561-1624 (June 18) 1927

*Alkali Necrosis of Uterus and Adnexa. H. Runge.—p. 1562.
Ovarian Pregnancy. R. Zimmermann.—p. 1569.
Palpation of Skull During Birth. E. Sachs.—p. 1574.
Compression of Umbilical Cord by Child's Hand. H. Saenger.—p. 1578.
Conservative Dilatation of Cervix. A. Hochenbichler.—p. 1580.
Phlegmonous Gastritis and Hydramnion. C. Schmidt.—p. 1583.
*Squatting Position in Puerperium. A. Hartmann.—p. 1586.
Delayed Labor and Absence of Pains with Placenta Praevia Centralis. G. Lunz.—p. 1587.
Simplified Technic of Tubal Sterilization. M. Köhler.—p. 1589.

Alkali Necrosis of Uterus and Adnexa.—Intra-uterine injections of solutions of soft soap, Runge states, are a popular method of abortion. He reports two cases in which the solution was apparently injected into the uterine tissue by mistake. Through the blood stream it spread over the entire uterus and to the adnexa, resulting in aseptic necrosis. The clinical picture was that of diffuse peritonitis. Immediate laparotomy with amputation of the uterus saved the patients' lives.

Squatting Position in Puerperium.—The squatting position in labor and in the puerperium has been in use in China from ancient times, Hartmann says. After the birth it is maintained without change for at least three days, by some women for as long as four weeks. It does not, however, appear to lessen the danger of hemorrhage.

51: 1625-1688 (June 25) 1927

Ovarian Hormone and Ovum. A. Mahnert and H. Siegmund.—p. 1626.
Heterotopic Epithelial Proliferation. K. von Oettingen.—p. 1635.
*Blood Pressure in Eclampsia After Ultraviolet Irradiation. A. Hochenbichler.—p. 1639.
Hemorrhage from Capsule of Myoma. H. Saenger.—p. 1643.
Hemorrhage from Corpus Luteum. E. Völcker.—p. 1645.
Analysis of Heredity in Deciding Paternity: Reply. R. Scheffer.—p. 1647.
*Rupture of Tentorium in Cesarean Section. F. Siegert.—p. 1649.
Birth Injuries. Holzapfel.—p. 1652.
*Induction of Labor at Term. A. Ostrčil.—p. 1654.

Ultraviolet Irradiation in Eclampsia.—Hochenbichler saw good results from the application of ultraviolet rays in the preeclamptic condition and even after the onset of convulsions. Of 100 patients treated in the early stages, none developed serious complications. It is important to test the lamp by a dosimeter at least every four weeks. He recounts a case in which the patient's blood pressure rose after each irradiation instead of falling, whereas after irradiations with another lamp, the expected fall took place. The biologic activity of the lamp was defective, although the number of hours that it had burned was less than in the case of the control lamp.

Rupture of Tentorium and Intracranial Hemorrhage in Cesarean Section.—Injury to the child's brain in cesarean section is believed by Siegert to occur more frequently than is supposed. He reports a case in which necropsy on an infant who died two days after delivery by this means revealed bilateral rupture of the tentorium. The membranes had not ruptured before the operation and the delivery of the head had been accomplished without unusual difficulty. The placenta had lain in the wound opening and the child's head had presented in the incision.

Artificial Induction of Labor at End of Pregnancy.—To induce the onset of labor after term, Ostrčil gives from one to three subcutaneous injections of 0.00033 Gm. of strychnine nitrate at half hour intervals. If the contractions have not set in two hours after the last injection, he injects a solution of pituitary intravenously very slowly. Another method in use in the Prague clinic is to give 0.15 Gm. of quinine after the last injection of strychnine and to follow this by 0.1 Gm. every half hour until labor begins (not more than 1 Gm. per day is given). Strychnine and pituitary solution are contraindicated in eclampsia and other conditions in which a rise in blood pressure must be avoided.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

71: 3089-3204 (June 4) 1927

*"Substitution" Experiments with Rous Sarcoma. C. Bonne.—p. 3090.
Acute Myeloblastic or Lymphoblastic Leukemia? A. Bakker.—p. 3097.
*Case of Double Athetosis. G. C. Bolten.—p. 3107.
Birth and Childbed Customs in Zeeland Thirty Years Ago. H. R. Folmer.—p. 3112.
History of the Plague at Utrecht. A. J. van der Weyde.—p. 3119.
A Fictitious History of Eyeglasses. H. J. M. Weve.—p. 3140.

Experiments with Rous Sarcoma.—Bonne attempted to obtain positive substitution, in Gye's sense, of the virus of Rous sarcoma by the virus of tumors of mammals, particularly of man. He was unsuccessful.

Case of Double Athetosis.—Bolten reports a case of double athetosis in a boy, aged 15 years. The disease followed an

attack of (presumably) encephalitis when he was 10 months old. Double athetosis, Bolten points out, is a form of cerebral infantile paralysis and must not be confused with bilateral athetosis. It was characterized, in the case described, by spasticity of the lower extremities, flexed hip and knee joints, involuntary, uncoordinated and asymetrical movements, and by brief spasms of the facial muscles. Speech was not dysarthric, but was irregular and agitated. Intellect was good. Bolten believes that the cause of this disease must be sought for in or in the vicinity of the subcortical nuclei.

71: 3205-3276 (June 11) 1927

*Surgical Treatment of Trigeminal Neuralgia. W. F. Suermondt.—p. 3209.
Tubercles in Lung in Miliary Tuberculosis. R. Korteweg.—p. 3223.
Nonoperative Treatment of Prostatic Hypertrophy. J. A. Weijtlandt.—p. 3228.

Surgical Treatment of Trigeminal Neuralgia.—Suermondt analyzes the results in fifty-seven cases. In light cases he recommends exeresis of the peripheral nerve trunks. If this does not succeed, roentgen-ray treatment should be tried, and if this does not help, the ganglion may be excised. If excision is contraindicated by the patient's general condition, alcohol may be injected into the ganglion. Carried out with great care, the last procedure effects lasting cure in many cases.

71: 3277-3368 (June 18) 1927

*"On the Watchtower." H. Zwaardemaker.—p. 3278.
Diagnosis of Lesions of Bile Ducts with Duodenal Sound. G. Jordans and H. Bartels.—p. 3285.
Cure of Case of Addison's Disease. J. L. A. Peutz.—p. 3295.
Tumors of Lip, Mouth, Stomach and Lungs in Tarred Mice. C. Bonne.—p. 3314.

Radioactivity of Potassium.—Experiments made by Zwaardemaker on the isolated heart, showed that the heart beat depends on the activation of a "mother stuff" by irradiation. Under normal conditions, the source of this irradiation is the potassium in the tissues. Under experimental conditions, with the potassium removed, the "mother stuff" could be activated with radium, polonium, mesothorium or cathode rays, but not with roentgen rays. His theory is that wherever potassium is present, and can act on the "mother stuff," "automatins" or "irradiation substances" arise, which are distributed through the organism and maintain motion in organs. Nerves and hormones regulate more or less directly the movements.

71: 3369-3472 (June 25) 1927

*Vitamin A in Urolithiasis. E. C. van Leersum.—p. 3370.
Irradiation with Weak Radium Rays and Automatism. H. Zwaardemaker.—p. 3381.
Is Acute Glomerulonephritis a Capillaropathy? W. C. Aalsmeer and E. L. Vaerst.—p. 3395.
Huge Tumor of Ovary. N. J. A. F. Boerma.—p. 3400.
Eclampsia After Twin Birth. H. Boshouwers.—p. 3401.

Vitamin A in Urolithiasis.—In experiments on rats, van Leersum found an apparent causal connection between lack of vitamin A in the diet and phosphate calculi in the bladder.

Acta Obstet. et Gynec. Scandinavica, Helsingfors

6: 109-210, 1927

Hemorrhage in Corpus Luteum. L. Simon.—p. 109. In English.
Fibromyomas in Mesentery. E. Bovin.—p. 135. In English.
Craniotomy. G. Fischer.—p. 144. In English.
*Placental Fragments Retained at Parturition. C. M. Ryberg.—p. 153. In English.
Uterosalpingography. S. N. Bakke.—p. 161. In English.

Placental Fragments Retained at Parturition.—Ryberg analyzes forty-five cases of partial placental retention. The most serious symptom was hemorrhage, which began in the first week in 55 per cent of cases. Fever was present in 70 per cent. It began in the first week in all but one case. In half the cases the placental fragment was spontaneously expelled. Removal as soon as possible after a positive diagnosis has been made is the best course, in his opinion.

Hospitalstidende, Copenhagen

70: 549-576 (June 16) 1927

*Prognosis in High Grade Myopia. K. K. K. Lundsgaard.—p. 549.

Prognosis in High Grade Myopia.—In Lundsgaard's 61,968 cases of eye disease there were 1,547 cases of myopia of 6.00 or higher, with a maximum myopia of 26.00 in women and 30.00 in men. Myopia was present in 2.20 per cent of the men and 2.72 per cent of the women. Chorioretinitis appeared most often, in almost 19 per cent of the women and about 11 per cent of the men. Detachment of the retina was found in only about 2 per cent of men and women. In the higher grades of myopia the prognosis was about the same for both sexes. Progression in myopia of 6.00 or more practically always ceased before the age of 20. Close work does not increase the myopia or the danger of complications.

Ugeskrift for Læger, Copenhagen

89: 607-634 (July 14) 1927

*Size and Shape of Erythrocytes in Anemia. H. C. Gram.—p. 607.
Treatment with Metal Salts. L. E. Walbum.—p. 612. C'td.
*Case of Spinal Hemiplegia. V. Christiansen.—p. 618.
*Pathogenesis of Edema. P. Iversen and F. Nakazawa.—p. 623. C'td.
*Synthalin in Treatment of Diabetes. J. N. Lorenzen.—p. 626.

Size and Shape of Erythrocytes in Anemia.—Investigations in ten cases of pernicious anemia and twelve of simple anemia are reported by Gram. The diameter of normal blood cells averages about 7.8 microns; the cubic contents about 87 cubic microns; the average thickness, about 1.84 microns. In pernicious anemia the average thickness was usually increased; when the average diameter was nearly normal, the thickness was also normal. In simple anemia without microcytosis, the average thickness was almost always normal; with pronounced microcytosis, it was often diminished. An exception was found in a case of simple anemia with microcytosis, examined for the second time after regeneration had begun. He believes this might indicate that the vitally stained microcytes are thick blood corpuscles. He rejects the Jørgensen-Warburg test in the diagnosis of pernicious anemia.

Case of Spinal Hemiplegia.—Christiansen describes in detail a steadily progressive disease of one and one-half years duration in a girl, aged 20. It began with paresthesia of the two ulnar fingers of the right hand. He emphasizes the fact that the symptoms are confined strictly to the right side and that repeated examination has failed to show the slightest sensory disturbance, especially thermal, on the left side. The subjective and objective symptoms speak against a cerebral disturbance. The distribution of the paresis suggests a lesion of the sixth, fifth and fourth cervical segments or their anterior motor roots. The spinal cord seems to be the seat of the process, particularly because of the paresis of muscles of the right arm, together with symptoms of disturbance of the right anterior pyramidal tract. An extramedullary, but intraspinal tumor is probable.

Pathogenesis of Edema.—This report on nephrotic edema by Iversen and Nakazawa is preceded by a reference to Iversen's "Theory and Treatment of Edema" (Ugeskrift for Læger, No. 3, 1927). In four cases with chronic high grade albuminuria there was a colloid-osmotic pressure so low that it alone could explain an edema (Hagedorn, Rasmussen, and Rehberg). In four cases with acute albuminuria, there was decrease in the colloid-osmotic pressure sufficient to account for the edema. The albuminuria seems to be of great pathogenic significance in both groups. In patients not confined to bed, without pathologically increased hydrostatic pressure, edema of the lower extremities is present with a colloid-osmotic pressure of from 240 to 270.

Synthalin in Treatment of Diabetes.—Lorenzen's continued use of synthalin in two cases resulted in digestive and renal disturbances, which disappeared when the synthalin was stopped and insulin resumed.

89: 635-662 (July 21) 1927

Case of Cholesteatomatous Suppuration of the Middle Ear. R. Lund.—p. 635.
*Pathogenesis of Edema. P. Iversen and F. Nakazawa.—p. 640. C'cn.
Treatment with Metal Salts. L. E. Walbum.—p. 644. C'cn.
Use of "Sanocrysin" at Home. K. F. M. Sandberg.—p. 650.

Pathogenesis of Edema.—In Iversen and Nakazawa's six cases of cardiac edema a lowered colloid-osmotic pressure was observed in all. The albuminuria from stasis due to cardiac insufficiency appears to play a rôle in this decrease. The decrease in some cases suffices to explain the edema, but the increased hydrostatic pressure due to impaired circulation is important in all cases, and in some essential.